

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

FRACTUS, S.A.,	§	
	§	
<i>Plaintiff,</i>	§	
	§	
v.	§	CIVIL ACTION NO. 2:20-CV-00097-JRG
	§	
TCL CORP., TCL COMMUNICATION	§	
TECHNOLOGY HOLDINGS LTD., TCT	§	
MOBILE WORLDWIDE, LTD., TCT	§	
MOBILE INTERNATIONAL, LTD.,	§	
	§	
<i>Defendants.</i>	§	

CLAIM CONSTRUCTION MEMORANDUM OPINION AND ORDER

Before the Court is the Opening Claim Construction Brief (Dkt. No. 61) filed by Plaintiff Fractus, S.A. (“Plaintiff” or “Fractus”). Also before the Court is the Responsive Claim Construction Brief (Dkt. No. 65) filed by Defendants TCL Corp., TCL Communication Technology Holdings, Ltd., TCT Mobile Worldwide, Ltd., and TCT Mobile International, Ltd. (“Defendants” or “TCL”) as well as Plaintiff’s reply (Dkt. No. 67). The Court held a hearing on July 6, 2021. (Dkt. No. 75). Having considered the arguments and evidence presented by the parties at the hearing and in their briefing, the Court now issues this Order and adopts the claim constructions stated herein.

Table of Contents

I. BACKGROUND.....	3
II. LEGAL PRINCIPLES	4
III. AGREED TERMS.....	9
IV. DISPUTED TERMS.....	10
A. “multilevel structure” / “structure for the multi-band antenna” / “antenna element [having / with] [a / the] multiband behavior”	10
B. “geometric element(s)”	16
C. “substantially within” terms	20
D. “empty space” terms	27
E. “level(s) of detail” / “level of structural detail”	31
F. “the second portion is a second level of structural detail within the first level of structural detail”.....	34
G. “number of sides”	37
H. “fractal type antenna”	40
I. “substantially similar impedance level and radiation pattern,” “radio electric behavior substantially similar,” and “substantially similar combined amount of resistance and reactance . . . and radiation pattern”	45
J. “current” terms	51
K. “wherein the geometric elements are arranged such that the antenna element does not comprise a group of single band antennas that respectively operate in the at least first and second non-overlapping frequency bands”	56
L. “generally identifiable”	59
M. “at least substantial parts of said second and third portions being part of the first portion”	62
N. “portions substantially overlap”.....	65
O. “associated with”	67
P. “a closed figure defined by a free perimeter thereof and a projection of ones of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures”	69
V. CONCLUSION.....	73

I. BACKGROUND

Plaintiff alleges infringement of United States Patents No. 7,394,432 (“’432 Patent”), 7,397,431 (“’431 Patent”), 8,941,541 (“’541 Patent”), 8,976,069 (“’069 Patent”), 9,054,421 (“’421 Patent”), 9,240,632 (“’632 Patent”), and 9,362,617 (“’617 Patent”) (collectively, “the patents-in-suit”). (Dkt. No. 61, Exs. 16–22). Plaintiff submits that its innovations relate to “creating multiband antennas that used certain fractal antenna concepts,” and “[t]he inventions in this lawsuit permit antennas to operate in smaller spaces at multiple frequency bands.” (Dkt. No. 61, at 1).

The ’432 Patent, for example, is titled “Multilevel Antenna,” issued on July 1, 2008, and bears an earliest priority date of September 20, 1999. The Abstract of the ’432 Patent states:

Antennae in which the corresponding radiative element contains at least one multilevel structure formed by a set of similar geometric elements (polygons or polyhedrons) electromagnetically coupled and grouped such that in the structure of the antenna can be identified each of the basic component elements. The design is such that it provides two important advantages: the antenna may operate simultaneously in several frequencies, and/or its size can be substantially reduced. Thus, a multiband radioelectric behaviour is achieved, that is, a similar behavior for different frequency bands.

This Court, as well as the Northern District of Texas, previously construed disputed terms in the patents-in-suit in:

Fractus, S.A. v. Samsung Elecs. Co., et al., 6:09-CV-203, Dkt. No. 526 (E.D. Tex. Dec. 17, 2010) (Love, J.) (“Samsung”) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 3);

Fractus, S.A. v. ZTE Corp., et al., 2:17-CV-561, Dkt. No. 93 (E.D. Tex. Sept. 7, 2018) (Gilstrap, J.) (“ZTE”) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 2)¹; and

Fractus, S.A. v. ZTE Corp., et al., No. 3:18-CV-2838-K, Dkt. No. 159, Amended Markman Order at 5–7 (N.D. Tex. Mar. 15, 2019) (Kinkeade, J.) (“ZTE (N.D. Tex.)”) (attached to Defendants’ response brief (Dkt. No. 65) as Exhibit I).

¹ The Court also construed terms in other patents held by Plaintiff in *Fractus, S.A. v. AT&T Mobility LLC*, 2:18-CV-00135-JRG, 2019 WL 1641357, at *28 (E.D. Tex. Apr. 16, 2019) (“AT&T”).

The parties submit that the specifications of the patents-in-suit are “virtually identical,” and for ease of reference the parties refer to the specification of the ’432 Patent throughout their briefing. (See Dkt. No. 61, at 1 n.1; *see also* Dkt. No. 65 at 3).

II. LEGAL PRINCIPLES

It is understood that “[a] claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention.” *Burke, Inc. v. Bruno Independ. Living Aids, Inc.*, 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). “In some cases, however, the district court will need to look beyond the patent’s intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period.” *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015) (citation omitted). “In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the ‘evidentiary underpinnings’ of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.” *Id.* (citing *Markman*, 517 U.S. 370).

A. Claim Construction

To ascertain the meaning of claims, courts look to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. The specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. *Id.* A patent’s claims must be read in view of the specification, of which they are a part. *Id.* For claim construction purposes, the description may act as a sort of dictionary,

which explains the invention and may define or otherwise limited the scope of terms used in the claims. *Id.* “One purpose for examining the specification is to determine if the patentee has limited the scope of the claims.” *Watts v. XL Sys., Inc.*, 232 F.3d 877, 882 (Fed. Cir. 2000).

Nonetheless, it is the claims—not the specification—that set forth the limits of the patentee’s invention. Otherwise, there would be no need for claims. *SRI Int’l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

This Court’s claim construction analysis is substantially guided by the Federal Circuit’s decision in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that “the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id.* The ordinary and customary meaning of a claim term “is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Id.* at 1313. This principle of patent law flows naturally from the recognition that

inventors are usually persons who are skilled in the field of the invention and that patents are addressed to, and intended to be read by, others skilled in the particular art. *Id.*

Phillips further made clear that “the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.* Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of “a fully integrated written instrument.” *Id.* at 1315 (quoting *Markman*, 52 F.3d at 978). Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id.* at 1314–17. As the Supreme Court stated long ago, “in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims.” *Bates v. Coe*, 98 U.S. 31, 38 (1878). In addressing the role of the specification, the *Phillips* court quoted with approval its earlier observations from *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998):

Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.

Phillips, 415 F.3d at 1316. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. Like the specification, the prosecution history helps to demonstrate how the inventor and the United States Patent and Trademark Office (“PTO”) understood the patent. *Id.* at 1317. However, since the file history “represents an ongoing negotiation between the PTO and the applicant,” it

may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id.* Nevertheless, the prosecution history is intrinsic evidence that is relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims. *Id.*; see *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (noting that “a patentee’s statements during prosecution, whether relied on by the examiner or not, are relevant to claim interpretation”).

Phillips rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court eschewed the suggestion made in *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Phillips*, 415 F.3d at 1319–24. According to *Phillips*, reliance on dictionary definitions at the expense of the specification had the effect of “focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent.” *Id.* at 1321. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id.*

Phillips does not preclude all uses of dictionaries in claim construction proceedings. Instead, the Federal Circuit assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id.* at 1323–25. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction, bearing in mind the general rule that the claims measure the scope of the patent grant.

“[P]rior orders in related cases do not bar the Court from conducting additional construction in order to refine earlier claim constructions.” *TQP Dev., LLC v. Intuit Inc.*, No. 2:12-CV-180-WCB, 2014 WL 2810016, at *6 (E.D. Tex. June 20, 2014) (Bryson, J., sitting by designation). In general, however, prior claim construction proceedings involving the same patents-in-suit are “entitled to reasoned deference under the broad principals of *stare decisis* and the goals articulated by the Supreme Court in *Markman*, even though *stare decisis* may not be applicable *per se*.” *Maurice Mitchell Innovations, LP v. Intel Corp.*, No. 2:04-CV-450, 2006 WL 1751779, at *4 (E.D. Tex. June 21, 2006) (Davis, J.); *see TQP*, 2014 WL 2810016, at *6 (“[P]revious claim constructions in cases involving the same patent are entitled to substantial weight, and the Court has determined that it will not depart from those constructions absent a strong reason for doing so.”); *see also Teva*, 135 S. Ct. at 839–40 (“prior cases will sometimes be binding because of issue preclusion and sometimes will serve as persuasive authority”) (citation omitted); *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1329 (Fed. Cir. 2008) (noting “the importance of uniformity in the treatment of a given patent”) (quoting *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996)).

B. Definiteness

The Supreme Court of the United States has “read [35 U.S.C.] § 112, ¶ 2 to require that a patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910, 134 S. Ct. 2120, 2129 (2014). “A determination of claim indefiniteness is a legal conclusion that is drawn from the court’s performance of its duty as the construer of patent claims.” *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by*

Nautilus, 572 U.S. 898. The party asserting that a claim term is indefinite must prove indefiniteness by clear and convincing evidence. *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017).

III. AGREED TERMS

In their March 5, 2021 P.R. 4-3 Joint Claim Construction Statement (Dkt. No. 56, Ex. A) and in their briefing (Dkt. No. 61, Ex. 23), the parties submit the following agreements:

<u>Term</u>	<u>Agreed Construction</u>
“frequency band(s)” ’432 Patent, Claims 1, 6 ’431 Patent, Claims 1, 14, 30 ’541 Patent, Claims 17, 23 ’069 Patent, Claim 32 ’421 Patent, Claims 1, 11	“a range of frequencies”
“overall structure of the conductive radiating element” ’431 Patent, Claim 1 ’432 Patent, Claim 1 ’541 Patent, Claim 17	Plain and ordinary meaning (not “any portion of the antenna that radiates in one or more of the claimed frequency band(s)”)
“overall structure” ’431 Patent, Claims 14, 30 ’432 Patent, Claim 6	

Based on the parties’ agreement, the Court hereby adopts these agreed constructions.

IV. DISPUTED TERMS

A. “multilevel structure” / “structure for the multi-band antenna” / “antenna element [having / with] [a / the] multiband behavior”

<p>“multilevel structure” (’431 Patent, Claims 1, 14, 30; ’432 Patent, Claims 1, 6; ’541 Patent, Claim 17)</p> <p>“structure for the multi-band antenna” (’617 Patent, Claims 17, 19; ’632 Patent, Claim 17)</p> <p>“antenna element [having / with] [a / the] multiband behavior” (’069 Patent, Claims 32, 46; ’421 Patent, Claims 1, 11)</p>	
<p>Plaintiff’s Proposed Construction</p> <p>A structure for an antenna useable at multiple frequency bands with at least two levels of detail, wherein one level of detail makes up another level. These levels of detail are composed of polygons (polyhedrons) of the same type with the same number of sides (faces) wherein most of the polygons (polyhedrons) are clearly visible and individually distinguishable and most of the polygons (polyhedrons) having an area of contact, intersection or interconnection with other elements (polygons or polyhedrons) that is less than 50% of the perimeter or area.”</p>	<p>Defendants’ Proposed Construction</p> <p>Indefinite</p> <p>Alternatively:</p> <p>“a structure for an antenna useable at multiple frequency bands (proportional to the number of levels of detail) with at least two levels of detail, wherein one level of detail makes up another level. These levels of detail are composed of polygons (polyhedrons) of the same type with the same number of sides (faces) wherein at least 75% of the polygons (polyhedrons) are clearly visible and individually distinguishable and at least 75% of the polygons (polyhedrons) having an area of contact, intersection or interconnection with other elements (polygons or polyhedrons) that is less than 50% of the perimeter or area.”</p>

(Dkt. No. 56, Ex. B, at 1 & 7; Dkt. No. 61, at 2; Dkt. No. 71, Ex. A, at 1, 3–4, 6, 8–9, 11, 14, 17, 21 & 25).

(1) The Parties' Positions

Plaintiff submits that Defendants' expert, Dr. Chris Bartone, had no difficulty interpreting these disputed terms in the past, which Plaintiff argues undercuts Defendants' indefiniteness argument in the present case. (Dkt. No. 61, at 3). Plaintiff urges: "That two experts might apply those claims differently is why there are trials over the issue of infringement; it is not an indicia of indefiniteness." (*Id.* (citations omitted)). As to Defendants' alternative proposal, Plaintiff submits that *Samsung* rejected a similar proposal of "proportional to the number of levels of detail" and that *ZTE* rejected a similar proposal of "at least 75%." (*Id.* at 4).

Defendants respond that "[t]he term 'multilevel structure' was coined by the inventors, but the record does not sufficiently describe what the term purports to cover." (Dkt. No. 65, at 2). Defendants argue that "whether an antenna satisfies these attributes depends on how its geometry is viewed, an issue on which the common written description ('the Written Description') of this legacy of patents fails to provide guidance." (*Id.*). Defendants also note that the defendants in *ZTE* did not argue indefiniteness, and "neither of the prior rulings compels, or even foreshadows, a finding of definiteness here." (*Id.*, at 4). Further, Defendants argue that "the number of frequency bands at which the multilevel antenna is usable is proportional to the number of levels of detail." (*Id.*, at 5). Finally, Defendants argue that: "Fractus' proposed construction states that 'most' (i.e., greater than 50%) of the polygons or polyhedrons have this attribute. In arriving at this lower threshold, Fractus tellingly ignores highly germane portions of the inventors' specification." (*Id.*, at 6).

Plaintiff replies:

[T]he question is not whether two experts would view infringement differently – if that were so, there would never be a trial over infringement. Rather, the question is whether the claim, read in light of the specification and prosecution history, fails to inform those skilled in the art of its scope with reasonable certainty. And the

specification here provides ample guidance on how to identify the claimed multilevel structures.

(Dkt. No. 67, at 1 (citations omitted)). Plaintiff also argues that “*Samsung* squarely rejected TCL’s exact same indefiniteness argument in language indicating the claims are definite under any test” (*Id.*). Further, Plaintiff argues that “[t]his Court should decline to impose TCL’s ‘proportionality’ limitation just like the *Samsung* Court did,” and “the *ZTE* Court performed an extensive refutation of TCL’s proposed ‘75%’ limitation.” (*Id.*, at 2 (citations omitted)).

At the July 6, 2021 hearing, Defendants reiterated that this is a coined term that lacks any known meaning in the art and, therefore, the entire specification should be given weight when construing this term. Plaintiff argued that Defendants’ arguments demonstrate a battle of the experts regarding infringement, not indefiniteness.

(2) Analysis

“The parties agree that the[se] three disputed terms should be construed identically.” (Dkt. No. 65, at 2).

The Background and Summary of the Invention section of the specification states:

Multilevel antennae solve the operational limitations of fractal and multitriangular antennae. Their geometry is much more flexible, rich and varied, allowing operation of the antenna from two to many more bands, as well as providing a greater versatility as regards diagrams, band positions and impedance levels, to name a few examples. Although they are not fractal, multilevel antennae are characterised in that they comprise a number of elements which may be distinguished in the overall structure. Precisely because they clearly show several levels of detail (that of the overall structure and that of the individual elements which make it up), antennae provide a multiband behavior and/or a small size. The origin of their name also lies in said property.

’432 Patent at 2:31–43.

Plaintiff proposes the Court’s prior construction. Specifically, *Samsung* and *ZTE* construed “multilevel structure” and “structure for the multi-band antenna” to mean “a structure for an

antenna useable at multiple frequency bands with at least two levels of detail, wherein one level of detail makes up another level. These levels of detail are composed of polygons (polyhedrons) of the same type with the same number of sides (faces) wherein most of the polygons (polyhedrons) are clearly visible and individually distinguishable and most of the polygons (polyhedrons) having an area of contact, intersection or interconnection with other elements (polygons or polyhedrons) that is less than 50% of the perimeter or area.” *See Samsung* at 7–19; *see also ZTE* at 8–17.

Samsung rejected an indefiniteness argument:

The MLV patents provide a person of ordinary skill in the art . . . with the objective guidelines necessary to identify a multilevel structure in an antenna. Thus, even if Defendants are correct that there are different ways of drawing polygons on an antenna, so long as a multilevel structure *can* be identified within a particular antenna based on the objective guidelines provided by the MLV specifications and claims, a multilevel structure exists. Nonetheless, when and if the parties[’] experts disagree whether a multilevel structure actually exists in an allegedly infringing antenna, the jury will be charged with determining whether the patents are infringed. In other words, this determination is a question of infringement, not definiteness.

No. 6:09-CV-203, Dkt. No. 611, Dec. 17, 2010 Report and Recommendation at 8–9 (E.D. Tex. Feb. 8, 2011) (Love, J.) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 7).

The Court decided *Samsung* prior to *Nautilus*, 572 U.S. 898, and in *ZTE* there was no indefiniteness challenge. *See ZTE* at 8. Defendants point out that “there can be no serious question that *Nautilus* changed the law of indefiniteness.” *See Dow Chem. Co. v. Nova Chems. Corp. (Canada)*, 803 F.3d 620, 630 (Fed. Cir. 2015) (discussing 572 U.S. 898).

Nonetheless, the analysis in *Samsung* and *ZTE* demonstrates that the term “multilevel structure” “inform[s] those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus*, 572 U.S. at 910. The opinion of Defendants’ expert in this regard is unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 59). Contrary to Defendants’ arguments, the analysis does not hinge on the “unpredictable vagaries of any one

person's opinion." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014).

Defendants appear to suggest that the intrinsic record does not lend to a finding of definiteness, but the burden is not on Plaintiff to establish definiteness. Rather, it is incumbent on Defendants to prove indefiniteness by clear and convincing evidence. Here, Defendants simply have not met that burden. *See Sonix*, 844 F.3d at 1377.

As to Defendants' alternative proposed construction, *ZTE* considered and rejected arguments that the proposed "at least 75%" limitations are compelled by the Summary of the Invention, specification, prosecution history, or reexamination. *ZTE* at 13–17. The Court rejects Defendants' proposals of "at least 75%" for the same reasons set forth in *ZTE*. *See id.*

As to Defendants' proposal of "proportional to the number of levels of detail," the Background and Summary of the Invention section of the specification discloses:

A particular property of multilevel antennae is that their radioelectric behavior can be similar in several frequency bands. Antenna input parameters (impedance and radiation diagram) remain similar for several frequency bands (that is, the antenna has the same level of adaptation or standing wave relationship in each different band), and often the antenna presents almost identical radiation diagrams at different frequencies. This is due precisely to the multilevel structure of the antenna, that is, to the fact that it remains possible to identify in the antenna the majority of basic elements (same type polygons or polyhedrons) which make it up. The number of frequency bands is *proportional* to the number of scales or sizes of the polygonal elements or similar sets in which they are grouped contained in the geometry of the main radiating element.

* * *

In specialized literature it is already possible to find descriptions of certain antennae designs which allow to cover a few bands. However, in these designs the multiband behavior is achieved by grouping several single band antennae or by incorporating reactive elements in the antennae (concentrated elements as inductors or capacitors or their integrated versions such as posts or notches) which force the apparition of new resonance frequencies. Multilevel antennae on the contrary base their behavior on their particular geometry, offering a greater flexibility to the antenna designer as to the number of bands (*proportional to the number of levels of detail*), position, relative spacing and width, and thereby offer better and more varied characteristics for the final product.

'432 Patent at 3:1–15 & 3:45–57 (emphasis added).

This feature of being “proportional to the number of levels of detail,” however, should not be imported into the claims. *Samsung* rejected such a requirement, and also dependent Claim 15 of the '431 Patent expressly recites “a number of operating bands of the handset is proportional to the number of levels within said multilevel structure.” *See Phillips*, 415 F.3d at 1314 (“Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.”); *see also id.* at 1314–15. Finally, as to the patentee’s similar statement to the European Patent Office (“the number of bandwidths is proportional to the number of detail levels”), Defendants do not show that this statement justifies Defendants’ proposed limitation any more than the above-discussed similar statement in the specification. (*See* Dkt. No. 61, Ex. 10, Nov. 15, 2001 Reply, at 2 (FRACTCL3970232)).

The Court therefore adopts the *Samsung* and *ZTE* construction. Any remaining dispute presents factual issues regarding infringement rather than any legal question for claim construction. *See Acumed LLC v. Stryker Corp.*, 483 F.3d 800, 806 (Fed. Cir. 2007) (“[A] sound claim construction need not always purge every shred of ambiguity. The resolution of some line-drawing problems . . . is properly left to the trier of fact.”) (citing *PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1355 (Fed. Cir. 1998) (“after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact”)); *see also Eon Corp. IP Holdings LLC v. Silver Spring Networks, Inc.*, 815 F.3d 1314, 1318–19 (Fed. Cir. 2016) (citing *Acumed* and *PPG*).

The Court therefore hereby construes “**multilevel structure**,” “**structure for the multi-band antenna**,” and “**antenna element [having / with] [a / the] multiband behavior**” to mean

“a structure for an antenna useable at multiple frequency bands with at least two levels of detail, wherein one level of detail makes up another level. These levels of detail are composed of polygons (polyhedrons) of the same type with the same number of sides (faces) wherein most of the polygons (polyhedrons) are clearly visible and individually distinguishable and most of the polygons (polyhedrons) having an area of contact, intersection or interconnection with other elements (polygons or polyhedrons) that is less than 50% of the perimeter or area.”

B. “geometric element(s)”

“geometric element(s)” (’431 Patent, Claims 1, 14, 30; ’432 Patent, Claims 1, 6; ’069 Patent, Claims 32, 46; ’421 Patent, Claims 1, 5–7, 10; ’541 Patent, Claims 17; ’617 Patent, Claim 17)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“a closed plane figure bounded by straight sides, further including circles and ellipses, where a portion of a circle or ellipse is counted as one side”	“polygon(s) or polyhedron(s)” Polygon: “a closed plane figure bounded by straight lines or closed plane bound [<i>sic</i> , bounded] by a circle or an ellipse” Polyhedron: “a closed solid figure bounded by polygons”

(Dkt. No. 56, Ex. B, at 7; Dkt. No. 61, at 5; Dkt. No. 71, Ex. A, at 1–2; Dkt. No. 71, Ex. A, at 5, 6–7, 9–10, 11–12, 14–15, 17–18 & 25–26; *see id.*, at 19–20).

(1) The Parties' Positions

Plaintiff argues that “[b]oth the *Samsung* and *ZTE* courts were correct to conclude that a polygon can include both straight sides and a circle/ellipse.” (Dkt. No. 61, at 6). Plaintiff also argues that Defendants’ expert “provides this Court with no analysis that should cause it to reconsider the previous constructions of these terms.” (*Id.*, at 7).

Defendants respond that “TCL’s proposed construction ties the claims to the depiction of the invention.” (Dkt. No. 65, at 7). Defendants also argue that Plaintiff’s proposed construction “does not account for polyhedrons as being a ‘geometric element,’” “[t]he general understanding of ‘polygon’ is a planar figure defined by straight lines,” and “the notion of counting a portion of a circle or an ellipse as one side is incorrect . . . and . . . unnecessarily adds confusion . . .” (*Id.*, at 7–8).

Plaintiff replies that “[t]he *ZTE* Court did not provide a separate definition of polyhedron, and none is needed here,” and “the real dispute here is over the meaning of a polygon.” (Dkt. No. 65, at 2). Plaintiff also argues that *Samsung* and *ZTE* “were also correct in recognizing that a portion of a circle or an ellipse can count as one side” of a polygon, and “the experts and jury were able to apply [this] successfully in the *Samsung* trial.” (*Id.*, at 3).

At the July 6, 2021 hearing, Plaintiff argued for example that three-dimensional antennas may have straight-sided shapes projected onto curved structures, thereby becoming shapes that include curved sides. Defendants argued that the specification contains no support for “hybrid” polygons, and Defendants noted that polygons with increasing numbers of sides can begin to appear curved.

(2) Analysis

The Background and Summary of the Invention section of the specification states:

The present invention consists of an antenna whose radiating element is characterised by its geometrical shape, which basically comprises several polygons or polyhedrons of the same type.

'432 Patent at 2:44–47; *see id.* at 4:51–55. The specification further discloses that one of the “main characteristic[s]” of a multilevel antenna is a “multilevel geometry comprising polygon or polyhedron of the same class.” *Id.* at 3:30–33.

Samsung construed “geometric elements” as “polygons or polyhedrons.” *Samsung* at 21–23. *Samsung* initially construed “polygon” to mean “a closed plane figure bounded by straight lines, further including circles and ellipses.” *Id.* at 21. The parties in *Samsung* agreed that “polyhedron” means “a closed solid figure bounded by polygons.” *Samsung* at 21.

ZTE construed “geometric elements” and “polygon” to have the same construction: “a closed plane figure bounded by straight sides, further including circles and ellipses, where a portion of a circle or ellipse is counted as one side.” *ZTE* at 31 & 34. *ZTE* rejected a proposal to construe “geometric elements” and “polygon” to mean “a closed plane figure bounded by straight lines or closed plane bound by a circle or an ellipse.” *Id.* at 28. *ZTE* found that the specification, as well as certain claims of ancestor patents, refer to “hybrid shapes with both curved and straight sides.” *Id.* at 33; *see id.* at 31–33. For example, as noted in *ZTE*, Figure 7.8 “includes cylinders with curved and flat surfaces.” *Id.* at 32; *see* '432 Patent at Fig. 7.

Defendants respond that “this figure shows a collection of polyhedrons (not polygons),” and Defendants also submit that “those polyhedrons are composed of entire circles (not planar figures defined by both straight lines and a portion of a circle or ellipse).” Dkt. No. 65 at 8.

Regardless of how Figure 7.8 is interpreted, however, *Samsung* and *ZTE* relied on additional evidence. For example, *Samsung* explained:

The parties have cited various technical and general dictionaries to support their constructions. *See* Pl.’s BR. at 17; DEF. RESP. at 15–16. All of the dictionaries

support a finding that the independent term “polygon” is best described by Defendants’ construction, “a closed plane figure bounded by straight lines.” The Court notes that Plaintiff’s dictionary citations are to “curvilinear polygons,” which allow for the possibility of curved sides as opposed to the strict requirement of straight line segments. *See PL.’S EXHIBITS 13, 14.* However, the dictionaries also demonstrate that if the inventors of the MLV patents intended to claim curvilinear polygons, they would have used the technical term. Indeed, nothing before the Court establishes that a person of ordinary skill in the art would read “polygons” to include “curvilinear polygons.”

On the other hand, the MLV specifications specifically identify circles or ellipses as a special limiting case of polygons. ’868 [Patent]² at 2:32–37 (“[t]he present invention consists of an antenna . . . compris[ing] for example, triangles . . . or even circles and ellipses as a limiting case of a polygon with a large number of sides.”); *id.* at 4:42–48 (“[t]he present invention relates to an antenna . . . that is formed by gathering several polygon or polyhedron of the same type (for example, triangles, . . . even circles or ellipses as special limiting cases of a polygon with a large number of sides.”)). Additionally, the inventors of the MLV patents explicitly claimed embodiments allowing some sides of “polygons” formed with portions of circles and ellipses. *See e.g.* ’208 [Patent]³ at 10:17–19 (“4. The multi-band antenna as set forth in claim 1, wherein at least some polygons have perimeter regions comprising portions of circles or ellipses). As such, the Court construes “polygon” as, “a closed plane figure bounded by straight lines, further including circles and ellipses.”

Samsung at 20–21; *see ’432 Patent* at 2:47–50 (“circles and ellipses as a limiting case of a polygon with a large number of sides”).

Also, when rejecting an indefiniteness argument in *Samsung*, the Court noted that the patents “include claims explaining that the portion of a polygon consisting of a portion of a circle or ellipse is to be counted as one side of the polygon,” and a person of ordinary skill in the art “could understand that when counting the sides of a polygon, a ‘curved side’ consisting of a portion of a circle or ellipse should be counted as one side.” No. 6:09-CV-203, Dkt. No. 611, Report and

² United States Patent No. 7,015,868, one of the patents at issue in *Samsung*, is an ancestor of the present patents-in-suit.

³ *Samsung* noted that “[t]he ’432 [Patent] is a continuation of the ’208 [Patent], which in turn, is a continuation of the ’868 [Patent].” *Samsung* at 5.

Recommendation at 10–11 (E.D. Tex. Feb. 8, 2011) (Love, J.) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 7).

Later in the same case, the Court further clarified:

[T]he term ‘polygon’ may include a circle, ellipse or figures having sides consisting of portions of circles or ellipses and straight sides, i.e. hybrid structures, wherein each portion of a circle or ellipse is counted as one side.

No. 6:09-CV-203, Dkt. No. 901, Report and Recommendation at 6 (E.D. Tex. May 2, 2011) (Love, J.) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 6).

The opinions of Defendants’ expert to the contrary are unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 61–65).

The Court therefore hereby construes “**geometric element(s)**” to mean “**a closed plane figure bounded by straight sides, further including circles and ellipses, where a portion of a circle or ellipse is counted as one side.**”

C. “substantially within” terms

“said second and third portions being located substantially within the first portion” (‘432 Patent, Claim 1)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“the second and third portions have an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”	Indefinite Alternatively: “second [and third] portion[s] being significantly inside or enclosed by the first portion, where the first portion, the second portion, and the third portion differ in size or configuration”

“second portion [being] located substantially within the first portion”

(’431 Patent, Claim 1;
’632 Patent, Claim 17;
’617 Patent, Claim 17)

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“the second portion has an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”	Indefinite Alternatively: “second portion being significantly inside or enclosed by the first portion, where the first portion and the second portion differ in size or configuration”

“third portion located substantially within the first portion”

(’632 Patent, Claim 17;
’617 Patent, Claim 17)

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“the third portion has an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”	Indefinite Alternatively: “third portion being significantly inside or enclosed by the first portion, where the first portion and the third portion differ in size or configuration”

(Dkt. No. 56, Ex. B, at 9; Dkt. No. 61, at 7; Dkt. No. 71, Ex. A, at 2, 7, 21–22 & 26).

(1) The Parties’ Positions

Plaintiff argues that “TCL’s . . . indefiniteness argument is belied by the fact that this Court was previously able to construe these terms [in *ZTE*] (and they were applied successfully in the *Samsung* trial).” (Dkt. No. 61, at 8). Plaintiff submits, as to “TCL’s alternate construction for these terms, TCL presses the same argument Defendants lost in *ZTE*.” (*Id.*). Plaintiff also argues that “‘substantially within’ refers to the existence of substantial ‘overlap’ between the portions,”

“TCL cannot demonstrate – apart from conclusory assertions by its expert – that a person of skill in the art could not identify this ‘overlap,’” and “[t]here is no need for a strict numerical boundary for the degree of overlap.” (*Id.* at 9).

Defendants respond that “[t]he disputed terms are indefinite because they include a term of degree—‘substantially’—but the record fails to provide any objective standard for the term,” and “Fractus does not contend that the record includes an objective anchor for these terms.” (Dkt. No. 65, at 8–9). Alternatively, Defendants submit that their proposal that “within” means “inside or enclosed by” is consistent with the ordinary meaning of the term, and Defendants contend that the patentee did not give “within” a special definition. (*Id.*, at 10). Defendants argue that “Fractus’ proposal to construe ‘within’ to mean ‘has an area that overlaps an area of another portion’ also runs afoul of the canon of claim construction that different terms should be construed to mean different things.” (*Id.*, at 11).

Plaintiff replies that in recent years, including in *AT&T*, “courts have continually recognized the definiteness of ‘substantially’ claim terms when appropriate.” (Dkt. No. 67, at 3). Plaintiff also submits that “the *ZTE* Court found that F[r]actus’s consistent use of ‘overlapping’ during reexamination was intrinsic evidence that trumped dictionaries, especially considering that the overall term ‘multilevel’ was a term coined by the inventors.” *Id.* (citation omitted).

At the July 6, 2021 hearing, Plaintiff submitted that an antenna can be inside or enclosed by another antenna while still being independent in its operation. Plaintiff submitted that the patents-in-suit disclaim using a group of independent antennas. As to the word “substantially,” Plaintiff urged that mathematical precision is not required. Defendants argued that these terms were not part of the original specification and lack support.

(2) Analysis

The specification discloses:

In specialized literature it is already possible to find descriptions of certain antennae designs which allow to cover a few bands. However, in these designs the multiband behavior is achieved by *grouping several single band antennae* or by incorporating reactive elements in the antennae (concentrated elements as inductors or capacitors or their integrated versions such as posts or notches) which force the apparition of new resonance frequencies. *Multilevel antennae on the contrary base their behavior on their particular geometry*, offering a greater flexibility to the antenna designer as to the number of bands (proportional to the number of levels of detail), position, relative spacing and width, and thereby offer better and more varied characteristics for the final product.

'432 Patent at 3:45–49 (emphasis added).

ZTE found that “substantially within” refers to having overlapping areas. *See ZTE* at 43–45. The defendants in *Samsung* and *ZTE* did not assert indefiniteness, and Defendants in the present case emphasize the abrogation of the “insolubly ambiguous” standard for indefiniteness, which *Nautilus* replaced with a standard of reasonable clarity. *See Nautilus*, 572 U.S. at 910.

But the Court of Appeals for the Federal Circuit, both before and after *Nautilus*, has explained that words of approximation such as “substantially” usually do not give rise to indefiniteness. *See, e.g., Exmark Mfg. Co. v. Briggs & Stratton Power Prods. Group, LLC*, 879 F.3d 1332, 1345–47 (Fed. Cir. 2018) (affirming finding that “elongated and substantially straight” was not indefinite); *Tinnus Enterprises, LLC v. Telebrands Corp.*, 846 F.3d 1190, 1206 (Fed. Cir. 2017) (“substantially filled”); *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1359 (Fed. Cir. 2012) (“This court has repeatedly confirmed that relative terms such as ‘substantially’ do not render patent claims so unclear as to prevent a person of skill in the art from ascertaining the scope of the claim. . . . The criticized words [‘approach each other,’ ‘close to,’ ‘substantially equal,’ and ‘closely approximate’] are ubiquitous in patent claims.”) (citation and internal quotation marks omitted); *Verve LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002) (“Expressions

such as ‘substantially’ are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention.”); *Ecolab Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001) (“like the term ‘about,’ the term ‘substantially’ is a descriptive term commonly used in patent claims to ‘avoid a strict numerical boundary to the specified parameter’” (quoting *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1217 (Fed. Cir. 1995)).⁴ As to the present disputed terms, the word “substantially” is being used in such a permissible manner, and to find otherwise might amount to finding that the word “substantially” categorically gives rise to indefiniteness, which cannot be squared with the above-cited authorities.

The opinions of Defendants’ expert regarding uncertainty about whether “substantially” means “60%, 75%, 90%, 99%, or some other arbitrary and undefined number” are therefore unpersuasive. (Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 65; *see id.* at ¶¶ 66–68). The *Berkheimer* case cited by Defendants is likewise unpersuasive in light of the more directly applicable authorities cited above. *See Berkheimer v. HP Inc.*, 881 F.3d 1360, 1363–64 (Fed. Cir. 2018) (“minimal redundancy” found indefinite). Finally, Defendants’ repeated attempts, in the briefing and at oral argument, to fault Plaintiff for not identifying an “objective standard” for the challenged term are of no consequence. This line of argument both improperly shifts the burden and misstates the legal standard for indefiniteness. Defendants have not furnished clear and convincing evidence that “substantially,” as used in the patent, lacks a reasonably certain meaning to a skilled artisan. Accordingly, the Court finds that this term is not indefinite.

⁴ The court reached a similar conclusion as to the term “radiation and impedance patterns that are substantially similar in a plurality of the plurality of working frequency bands” in *AT&T*. *See Fractus, S.A. v. AT&T Mobility LLC*, No. 2:18-CV-00135-JRG, 2019 WL 1641357 (E.D. Tex. 2019) (citing, *e.g.*, *Exmark*). Also, *Samsung* rejected an indefiniteness challenge as to “substantially similar . . . radioelectric behavior.” *See Samsung* at 26–27.

Finally, Defendants note that Claim 17 of the '632 Patent recites not only "substantially within" but also "substantially overlap" (emphasis added):

17. A multi-band antenna including:

at least one structure for the multi-band antenna useable at least three ranges of frequencies, each of the at least three ranges of frequencies extending between two limiting frequencies, the at least one structure being included in a portable communication device and including at least two levels of detail, wherein one level of detail makes up another level of detail, the at least one structure including at least one antenna region comprising a set of closed figures bounded by the same number of sides, the sides comprising one or more of straight lines, portions of circles and portions of ellipses,

the at least one structure including at least three portions, a first portion having a first geometry configured to operate at a range of frequencies of the three ranges of frequencies, a second portion located *substantially within* the first portion and having a second geometry configured to operate at a range of frequencies of the three ranges of frequencies and a third portion located substantially within the first portion and having a third geometry configured to operate at a range of frequencies of the three ranges of frequencies, the second and third portions *substantially overlap* with the first portion,

wherein each of the closed figures in the antenna region is directly or proximately linked to at least one other of the closed figures such that electromagnetic power is exchanged between the closed figures in the antenna region either directly through at least one point of contact or through a small separation providing coupling,

wherein for at least 75% of the closed figures, the region or area of contact between the closed figures is less than 50% of their perimeter or area,

wherein not all of the closed figures have the same size and the perimeter of the at least one structure has a different number of sides than the closed figures that compose the antenna region,

wherein each of a plurality of the closed figures of the antenna region is generally identifiable as a closed figure defined by a free perimeter thereof and a projection of one of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures where the closed figures perimeters are interconnected, and

wherein the multi-band antenna is configured to operate at the at least three ranges of frequencies and wherein at least one of the at least three ranges of frequencies is within the 800 MHz–3600 MHz frequency range.

Defendants argue that this claim demonstrates that "substantially within" means something other than "substantially overlap," because "[i]n the absence of any evidence to the contrary, we

must presume that the use of these different terms in the claims connotes different meanings.”

CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG, 224 F.3d 1308, 1317 (Fed. Cir. 2000).

But although “the use of both terms in close proximity in the same claim gives rise to an inference that a different meaning should be assigned to each,” “it is not unknown for different words to be used to express similar concepts, even though it may be poor drafting practice.”

Bancorp Servs., LLC v. Hartford Life Ins. Co., 359 F.3d 1367, 1373 (Fed. Cir. 2004).

As found in *ZTE* (cited above), the better reading of the phrase “substantially within” in light of the intrinsic evidence is that the phrase refers to substantial overlap.

The Court therefore hereby construes these disputed terms as set forth in the following chart:

<u>Term</u>	<u>Construction</u>
“said second and third portions being located substantially within the first portion”	“the second and third portions have an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”
“second portion [being] located substantially within the first portion”	“the second portion has an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”
“third portion located substantially within the first portion”	“the third portion has an area that substantially overlaps an area of the first portion, where the portions differ in size or configuration”

D. “empty space” terms

“said first[, / and], second[, and third] portions defining empty spaces in an overall structure”

(’432 Patent, Claims 1, 6;
’431 Patent, Claim 1;
’541 Patent, Claim 17)

“plurality of geometric elements arranged to define empty spaces in the antenna element”

(’421 Patent, Claim 1)

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“said first, second and third portions defining areas without conductive material in an overall structure”	“two or more open spaces without conductive material and which are each enclosed within conductive material of [the first, second, and third portions of the overall structure / antenna element]”

(Dkt. No. 56, Ex. B, at 12; Dkt. No. 61, at 10; Dkt. No. 71, Ex. A, at 2, 12 & 18).

(1) The Parties’ Positions

Plaintiff submits that *Samsung* rejected an argument that the “empty spaces” at issue must be completely enclosed by conductive material.” (Dkt. No. 61 at 10).

Defendants respond: “An empty space is ‘defin[ed]’ by portions of an antenna only if those portions enclose the empty space. Otherwise, the space is unbounded, i.e., undefined.” (Dkt. No. 65, at 11). Further, Defendants argue that “[t]he prosecution history of the ’431 patent supports TCL,” and Defendants argue that Plaintiff’s proposal “strays from the claim language,” “improperly assumes that all embodiments of the Patents-in-Suit meet these claim elements,” and “does not clarify the term.” (*Id.*, at 12).

Plaintiff replies that “TCL has no specific explanation as to why the *Samsung* Court was wrong when it rejected TCL’s construction.” (Dkt. No. 67, at 4 (citation omitted)). Plaintiff

submits that “[e]mptiness can certainly be ‘defined’ by something other than a border of conductive material.” (*Id.*). Further, Plaintiff argues that “TCL selects embodiments it prefers (e.g., Figure 1), and casts aside those that contradict it.” (*Id.*)

At the July 6, 2021 hearing, the parties presented no oral arguments and instead rested on their briefing.

(2) Analysis

These terms were not presented as disputed terms in *ZTE*.

Samsung construed these terms to mean “said first, second and third portions defining areas without conductive material in an overall structure,” as Plaintiff proposes in the present case. *See Samsung* at 37–38. *Samsung* reasoned:

The MLV⁵ specifications demonstrate that the empty spaces exist “between the various polygon or polyhedron elements” to force the current on a longer path. ’868 [Patent]⁶ at 3:5–15. The function of these empty spaces does not require them to be completely enclosed within the polygons or polyhedrons which make up the multilevel antenna. While Defendants are correct that some embodiments show empty spaces completely enclosed (*see id.* at Figure 1), other embodiments show unbounded empty spaces that could force the current on a longer path. (*see id.* at Figures 4.4, 4.8, 6.6 and 7.4).

Id. at 37.

On one hand, the specification discloses several examples of empty spaces that are completely surrounded by conductive material, such as shown in Figure 1 of the ’432 Patent, which is reproduced here:

⁵ “MLV” is an abbreviation that refers to the “multilevel” family of patents held by Plaintiff, including for example the ’432 Patent that the parties cite throughout their briefing in the present case.

⁶ United States Patent No. 7,015,868, one of the patents at issue in *Samsung*, is an ancestor of the present patents-in-suit.

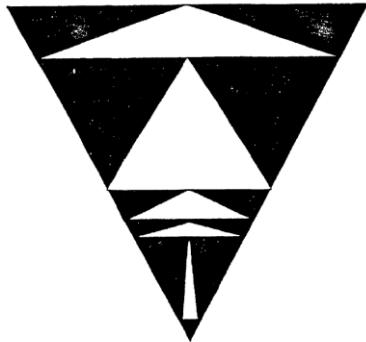


FIG. 1

On the other hand, the specification also discloses empty spaces that are not completely surrounded by conductive material. As one example, Figure 4.8 of the '432 Patent is reproduced here:



On balance, the Court adopts the *Samsung* construction and rejects Defendants' argument that the empty spaces must be "enclosed within conductive material." The prosecution history in which the patentee cited Figure 1 (reproduced above) does not compel otherwise. (*See* Dkt. No. 65, Ex. D, Amendment and Response to Office Action, at 10). No narrow definition or disclaimer is apparent. (*See id.*). Indeed, Defendants acknowledge that the patentee referred to Figure 1 as "only one example of many within the figures of the application." (*Id.*). The opinions of Defendants' expert are also unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 75).

The claim language reciting “defined” and “in” does not compel otherwise. Defendants cite authority that “a claim construction analysis must begin and remain centered on the claim language itself.” *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). Yet, any fair viewing of above-reproduced Figure 4.8, for example, would have no difficulty identifying “empty spaces” “defin[ed]” by the “overall structure” as recited in the disputed terms. Defendants’ argument that Figure 4.8 and similar figures could be merely “unclaimed embodiments” is likewise rejected. (Dkt. No. 65, at 12 (citing *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1383 (Fed. Cir. 2008))).

Finally, Defendants argue that Plaintiff’s proposed construction fails to sufficiently clarify the scope of the claims, arguing that “including the key words ‘defining’ and ‘in’” in the construction would “impermissibly invite going to a jury with a claim construction dispute.” (Dkt. No. 65, at 12–13 (citing *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008))). On balance, however, adopting Plaintiff’s proposed construction and expressly rejecting Defendants’ proposed interpretation is sufficient to resolve the claim construction dispute, and any remaining dispute presents infringement issues for the finder of fact rather than any legal question for claim construction. *See Acumed*, 483 F.3d at 806 (“[A] sound claim construction need not always purge every shred of ambiguity. The resolution of some line-drawing problems . . . is properly left to the trier of fact.”) (citing *PPG*, 156 F.3d at 1355 (“after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact”)); *see also Eon*, 815 F.3d at 1318–19 (citing *Acumed* and *PPG*).

The Court therefore hereby construes “said first[, / and], second[, and third] portions defining empty spaces in an overall structure” and “plurality of geometric elements arranged to define empty spaces in the antenna element” to mean “said first, second and third portions defining areas without conductive material in an overall structure.”

E. “level(s) of detail” / “level of structural detail”

“level(s) of detail” (’632 Patent, Claim 17)	“level of structural detail” (’432 Patent, Claim 6; ’431 Patent, Claims 14, 30)
Plaintiff’s Proposed Construction “a first level of detail that clearly shows the overall structure, and a second level of detail that clearly shows most of the individual elements”	Defendants’ Proposed Construction “a level of structure in the multilevel structure that is clearly identifiable from another level of structural detail”

(Dkt. No. 56, Ex. B, at 18; Dkt. No. 61, at 11; Dkt. No. 71, Ex. A, at 4; Dkt. No. 71, Ex. A, at 9 & 22).

(1) The Parties’ Positions

Plaintiff submits that “TCL pursues the construction that the ZTE Court rejected,” and “[t]he intrinsic evidence supports this Court’s prior definition.” (Dkt. No. 61, at 11).

Defendants respond that whereas “TCL’s proposed construction is a straightforward interpretation of the claim language in the context of the specification,” Plaintiff’s proposal “contemplates only two levels of detail” even though “the claims contemplate three or more levels of detail,” and “Fractus’ proposed construction introduces confusion in that it references ‘the

individual elements,’ but ‘individual elements’ are not earlier recited in the claims.” (Dkt. No. 65, at 13).

Plaintiff replies that “TCL’s construction ignores the claim language and the specification’s teachings that the first level of detail is the overall structure and the second level of detail is made up of individual elements.” (Dkt. No. 67, at 4–5 (citations omitted)).

At the July 6, 2021 hearing, the parties presented no oral arguments and instead rested on their briefing.

(2) Analysis

ZTE construed the “level of structural” detail terms in Claim 6 of the ’432 Patent and Claims 14 and 30 of the ’431 Patent. Specifically, *ZTE* construed “first level of structural detail” to mean “detail that clearly shows the overall structure,” construed “second level of structural detail” to mean “detail that clearly shows most of the individual elements,” and construed “two levels of detail[]” to mean “a first level of detail that clearly shows the overall structure, and a second level of detail that clearly shows most of the individual elements.” *ZTE* at 23–28.

The Background and Summary of the Invention section of the specification states:

Multilevel antennae solve the operational limitations of fractal and multitriangular antennae. Their geometry is much more flexible, rich and varied, allowing operation of the antenna from two to many more bands, as well as providing a greater versatility as regards diagrams, band positions and impedance levels, to name a few examples. Although they are not fractal, multilevel antennae are characterised in that they comprise a number of elements which may be distinguished in the overall structure. Precisely because they clearly show *several levels of detail (that of the overall structure and that of the individual elements which make it up)*, antennae provide a multiband behavior and/or a small size. The origin of their name also lies in said property.

* * *

Its designation as multilevel antenna is precisely due to the fact that in the body of the antenna can be identified at least two levels of detail: that of the overall structure

and that of the majority of the elements (polygons or polyhedrons) which make it up.

* * *

Thus, the main characteristic of multilevel antennae are the following:

A multilevel geometry comprising polygon or polyhedron of the same class, electromagnetically coupled and grouped to form a larger structure. In multilevel geometry most of these elements are clearly visible as their area of contact, intersection or interconnection (if these exist) with[] other elements is always less than 50% of their perimeter.

The radioelectric behavior resulting from the geometry: multilevel antennae can present a multiband behavior (identical or similar for several frequency bands) and/or operate at a reduced frequency, which allows to reduce their size.

'432 Patent at 2:30–44, 2:60–64 & 3:30–44 (emphasis added); *see id.* at 5:35–38 (referring to “multilevel structures ([Figures] 4.1–4.14) formed by parallelepipeds (squares, rectangles, rhombi . . .)”; “the component elements are always individually identifiable (at least most of them are)”).

Defendants do not justify departing from the *ZTE* construction for the “level of detail” terms in Claim 6 of the '432 Patent and Claims 14 and 30 of the '431 Patent or for the “at least two levels of detail” term in Claim 17 of the '632 Patent. *See ZTE* at 23–28. The opinions of Defendants’ expert in this regard are unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 82).

Finally, Defendants argue that the phrase “individual elements” in the *ZTE* construction should not be introduced into the construction because “individual elements” lacks antecedent basis, but Defendants do not show any such requirement for antecedent basis. Instead, the phrase “individual elements” is readily understandable in the context of the specification of the patents-in-suit.

The Court therefore hereby construes these disputed terms as set forth in the following chart:

<u>Term</u>	<u>Construction</u>
“first level of structural detail”	“detail that clearly shows the overall structure”
“second level of structural detail”	“detail that clearly shows most of the individual elements”
“two levels of detail”	“a first level of detail that clearly shows the overall structure, and a second level of detail that clearly shows most of the individual elements”
“level of detail”	No construction necessary apart from the Court’s construction of other terms.

F. “the second portion is a second level of structural detail within the first level of structural detail”

“the second portion is a second level of structural detail within the first level of structural detail” (’431 Patent, Claims 14, 30; ’432 Patent, Claim 6)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary.	“the second portion is a second level of structural detail inside or enclosed by the first level of structural detail, where a level of structural detail is clearly identifiable from another level of structural detail”

(Dkt. No. 56, Ex. B, at 13; Dkt. No. 61, at 12; Dkt. No. 71, Ex. A, at 5 & 10).

(1) The Parties’ Positions

Plaintiff submits that Defendants’ argument in the present case “is simply a repeat of the previous defendant’s unsuccessful argument” in *ZTE*. (Dkt. No. 61, at 13). Plaintiff argues: “A critical distinction of these patents, as discussed, is the overlap between the second level of detail

and the first. Yet TCL’s construction would include additional designs because it encompasses single band antennas that are pushed together, but where the portions are not overlapping.” (*Id.*)

Defendants respond that they propose a construction consistent with their proposals as to “level of structural detail” and “within” (addressed above), and Defendants argue that “Fractus’ characterization of the Examiner’s reasons for allowance is imprecise.” (Dkt. No. 65, at 14).

Plaintiff replies that “[a]s this Court has already recognized [in *ZTE*], the ‘within’ term was added to distinguish the Johnson prior art expressly because the portions in Johnson did not substantially overlap – meaning that these patents do require that the portions substantially overlap.” (Dkt. No. 67, at 5 (citing *ZTE* at 48)).

At the July 6, 2021 hearing, the parties presented no oral arguments and instead rested on their briefing.

(2) Analysis

The Background and Summary of the Invention section of the specification provides context for the present disputed term by stating:

In specialized literature it is already possible to find descriptions of certain antennae designs which allow to cover a few bands. However, in these designs the multiband behavior is achieved by grouping several single band antennae or by incorporating reactive elements in the antennae (concentrated elements as inductors or capacitors or their integrated versions such as posts or notches) which force the apparition of new resonance frequencies. Multilevel antennae on the contrary base their behavior on their particular geometry, offering a greater flexibility to the antenna designer as to the number of bands (proportional to the number of levels of detail), position, relative spacing and width, and thereby offer better and more varied characteristics for the final product.

’432 Patent at 3:45–57.

ZTE analyzed the same term in the same claims at issue here, and Defendants here propose the same construction proposed by the defendants in *ZTE*. *ZTE* at 46–49. In *ZTE*, the Court found:

Given the context of the claim language, the Court finds that the term “within” should be given its plain and ordinary meaning. The Court has construed the terms “second level of structural detail” and “first level of structural detail.” Thus, the claim language will read as follows: “the second portion is a second [detail that clearly shows most of the individual elements] within the first [detail that clearly shows the overall structure].” As discussed, Plaintiff’s construction confuses the claim language by completely dropping the two “level of structural detail” terms. Defendants’ construction appears to read on a distinguished and disclaimed embodiment of multiple single-band antennas pushed together.

When considered in the context of the construction for the two “level of structural detail” terms, the disputed phrase is easily understandable by a jury, and should be given its plain and ordinary meaning. As discussed above, a person of ordinary skill would understand that “within” requires the area of the individual elements of the second portion to completely overlap with an area of the first portion. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the Parties, and given it its proper weight in light of the intrinsic evidence.

ZTE at 49. The Court also addressed the prosecution history raised again here by the parties. *See id.* at 48–49. The opinions of Defendants’ expert regarding the *ZTE* analysis are unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 76). Defendants have not met their burden to depart from the plain and ordinary meaning. *See Phillips*, 415 F.3d at 1312.

The Court therefore hereby construes “**the second portion is a second level of structural detail within the first level of structural detail**” to have its **plain meaning** (apart from the Court’s constructions of constituent terms).

G. “number of sides”

<p style="text-align: center;">“number of sides” (’432 Patent, Claim 6; ’431 Patent, Claims 14, 30; ’069 Patent, Claim 46; ’421 Patent, Claim 5; ’632 Patent, Claims 17, 19; ’617 Patent, Claim 17)</p>	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary	“number of straight sides for geometric elements bounded by straight sides, or a large number for geometric elements bounded by a circle or an ellipse”

(Dkt. No. 56, Ex. B, at 14; Dkt. No. 61, at 13; Dkt. No. 71, Ex. A, at 5, 10, 16, 22–23 & 26–27).

(1) The Parties’ Positions

Plaintiff submits that *Samsung* and *ZTE* rejected the interpretation that Defendants proposed in the present case. (Dkt. No. 61, at 13–14).

Defendants respond that “TCL’s proposed construction tracks the Written Description’s clear guidance,” such as that “[t]he only relevant teaching states that circles and ellipses are to be treated as a polygon ‘with a large number of sides.’” (Dkt. No. 65, at 14–15 (quoting ’432 Patent at 2:47–49)).

Plaintiff replies that “Fractus does not seek to have a circle or ellipse count as a one-sided polygon, but rather that a curved side of a polygon count as one side.” (Dkt. No. 67, at 5 (citations omitted)).

At the July 6, 2021 hearing, Plaintiff submitted that this disputed term is not being used to have any special technical meaning. Defendant emphasized disclosures in the specification

regarding “circles and ellipses as a limiting case of a polygon with a large number of sides” (cited below).

(2) Analysis

The Background and Summary of the Invention section of the specification states:

The present invention consists of an antenna whose radiating element is characterised by its geometrical shape, which basically comprises several polygons or polyhedrons of the same type. That is, it comprises for example triangles, squares, pentagons, hexagons or even circles and ellipses as a limiting case of a polygon with a large number of sides, as well as tetrahedra, hexahedra, prisms, dodecahedra, etc.

’432 Patent at 2:44–50.

ZTE construed the term “number of sides” to have its plain meaning, as Plaintiff proposes in the present case, and *ZTE* explained:

The claim language is clear and addresses the relationship between the number of sides of the multilevel structure and the number of sides for each of the geometric elements. For example, Claim 14 of the ’431 Patent recites that “the perimeter of the multilevel structure has a different number of sides than each of the geometric elements that compose the multilevel structure.” Simply stated, the structure and the elements do not have the same number of sides. This claim language is unambiguous, and is easily understandable by a jury, and should be given its plain and ordinary meaning. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the Parties, and given it its proper weight in light of the intrinsic evidence.

ZTE at 39. Relatedly, in *Samsung* the Court found:

[T]he term “polygon” may include a circle, ellipse or figures having sides consisting of portions of circles or ellipses and straight sides, i.e. hybrid structures, wherein each portion of a circle or ellipse is counted as one side.

No. 6:09-CV-203, Dkt. No. 901, Report and Recommendation at 6 (E.D. Tex. May 2, 2011) (Love, J.) (attached to Plaintiff’s opening brief (Dkt. No. 61) as Exhibit 6). Also, Plaintiff emphasizes that “Fractus does not seek to have a circle or ellipse count as a one-sided polygon, but rather that a curved side of a polygon count as one side.” (Dkt. No. 67, at 5 (citation omitted)).

Plaintiff's interpretation is consistent with the above-cited analysis in *ZTE* and *Samsung* as well as with other claims, such as Claim 3 of the '432 Patent reciting "geometric elements" that include "both linear and non-linear portions," and Claim 8 of the '421 Patent and Claim 25 of the '069 Patent reciting an apparatus "wherein at least one of the four sides of at least one of the geometric elements is curved." Defendants argue that the Court should cast these claims aside in the analysis because these claims are purportedly indefinite. This is a heavy burden for Defendants to undertake, however, because "other claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term," *Phillips*, 415 F.3d at 1314, and "[i]ndefiniteness must be proven by clear and convincing evidence." *Sonix*, 844 F.3d at 1377.

On balance, Defendants do not sufficiently justify setting aside the other claims cited by Plaintiff. The authorities cited by Defendants do not demonstrate otherwise. *See Trustees of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1367 (Fed. Cir. 2016) ("The claims are nonsensical . . . and are thus indefinite."); *see also Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1360 (Fed. Cir. 2016) ("The dependent claim tail cannot wag the independent claim dog."). The opinions of Defendants' expert are likewise unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 77–78).

Based on all of the foregoing, Defendants do not justify departing from the analysis in *ZTE*, and the Court therefore hereby construes "**number of sides**" to have its **plain meaning**.

H. “fractal type antenna”

“fractal type antenna” (’421 Patent, Claim 1)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“an antenna with a self-similar shape generated in an iterative manner on different scaling levels”	Indefinite Alternatively: “an antenna possessing ideal fractal geometry”

(Dkt. No. 56, Ex. B, at 15; Dkt. No. 61, at 14; Dkt. No. 71, Ex. A, at 18).

(1) The Parties’ Positions

Plaintiff argues that the patentee explained the meaning of this term during prosecution and in the specification. (Dkt. No. 61, at 15). Plaintiff also submits that *ZTE* rejected a construction that Defendants propose as an alternative in the present case. (*Id.*). Plaintiff proposes the *ZTE* construction but suggests that “self-similar,” as opposed to “self-copying,” “is a superior construction based on the intrinsic evidence.” (*Id.*, at 16).

Defendants respond that “[t]his term is indefinite because the term ‘fractal’ was not sufficiently clear to a person of ordinary skill in the art in 1999 and the modifier ‘type’ adds a further layer of ambiguity.” (Dkt. No. 65, at 15). Defendants submit that “‘fractal’ was not commonly understood even among the mathematical elites, much less an antenna designer.” (*Id.*, at 16). Also, Defendants submit that “‘fractal’ has been understood differently by all who have encountered it in connection with the Patents-in-Suit,” including the courts. (*Id.*; *see id.* at 15–16). Alternatively, Defendants argue that “[t]o the extent that the disputed term is not indefinite, it should be construed to cover only those antennas that possess ideal fractal geometry, and not, for example, antennas based on or derived from fractal designs.” (*Id.*, at 17).

Plaintiff replies that *Samsung* did not actually construe this term and, in any event, “[t]hat two different Courts offered two slightly different phrasings does not make a term indefinite.” (Dkt. No. 67, at 6). “Nor,” Plaintiff argues, “does a lack of a precise mathematical definition mean that there was not a commonly understood definition of what constitutes a fractal.” (*Id.*)

At the July 6, 2021 hearing, the parties presented no oral arguments and instead rested on their briefing.

(2) Analysis

Claim 1 of the '421 Patent recites (emphasis added):

1. An apparatus comprising:

an antenna element having a multi-band behavior and configured to operate in at least first and second non-overlapping frequency bands and comprising a plurality of geometric elements arranged to define empty spaces in the antenna element to provide at least first and second winding current paths through the antenna element, the at least first and second winding current paths circumventing the empty spaces and respectively corresponding to the at least first and second non-overlapping frequency bands to provide the antenna element with the multi-band behavior; and

a ground plane, the antenna element being electrically coupled to the ground plane;

wherein the antenna element provides a substantially similar impedance level and radiation pattern in the at least first and second non-overlapping frequency bands;

wherein the geometric elements are arranged such that the antenna element does not comprise a group of single band antennas that respectively operate in the at least first and second non-overlapping frequency bands; and

wherein the antenna element is not a fractal type antenna element.

ZTE found that Plaintiff's proposal of “self-similar shape” was “vague and potentially confusing to a jury.” *ZTE* at 59. *ZTE* found:

The Court finds that the best indication of how a person of ordinary skill in the art would understand the term can be found in the prosecution history of PCT Application No. ES99/00296. To distinguish the prior art, the patentees argued that “the antennas that are implemented do not have a fractal geometry.” The patentees further described the prior art as including a fractal antenna. Specifically, the patentees argued that “[i]n the case of [the prior art] we find Illustrated in figures 2, 3 and 4 exclusively the fractal known as the Sierpinski triangle, where we can

clearly observe that *it is formed by identical triangles* and that its geometry is obtained carrying out a self-copying on a different scaling level of the basic generating element of the structure.” Thus, the patentees described a fractal antenna as “self-copying [(e.g., identical triangles)] on a different scaling level of the basic generating element of the structure.” Accordingly, the Court finds that the term “fractal type antenna” should be construed to mean “an antenna with a self-copying shape generated in an iterative manner on different scaling levels.”

Id. (citations omitted; emphasis in *ZTE*).

This is consistent with the Background and Summary of the Invention section of the specification, which explains:

From a scientific standpoint strictly fractal antennae are impossible, as fractal objects are a mathematical abstraction which include an infinite number of elements. It is possible to generate antennae with a form based on said fractal objects, incorporating a finite number of iterations.

’432 Patent at 1:59–63 (also cited in *ZTE* at 58).

The opinions of Defendants’ expert, such as that “in 1999 there was no generally accepted meaning for ‘fractal,’” do not compel otherwise. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 78–80). Also, Defendants cite the statement by the Court in *Samsung* that “this term, fractal, is both unclear, not precisely defined, not consistently used, and has different meanings, depending upon when, where, and who is using it. . . . [I]t is not a reasonably descriptive term.” Dkt. No. 65, Ex. F, May 17, 2011 Trial Tr. at 108:19–25; *see id.* at 108:2–109:21 (emphasizing to the jury that the word “fractal” did not appear in any of the claims at trial in *Samsung*). But the Court in *ZTE* took this statement into account when arriving at a construction for the term “fractal type antenna.” *ZTE* at 58–59.

After the Court transferred the *ZTE* case to Northern District of Texas, the transferee court modified this Court’s construction:

As a mathematical concept, the self-similarity at different scaling levels is infinite, so no matter how many times the scaling is increased, the same pattern or shape is repeated again and again.

The confusion with the construction of “fractal type antenna” stems from the practical limitations of application of this abstract mathematical concept. Because the abstract concept includes an infinite number of self-similar shapes at an infinite number of scaling levels, the creation of an actual physical fractal is impossible. While one may create a fractal-like object that displays a self-similar shape at multiple scaling levels, one cannot create a fractal object that displays a self-similar shape at all scaling levels. Eventually the level of detail required to do this becomes too small to practically manufacture. For this reason, there will ultimately be a level of scale for a fractal-like object at which the object no longer displays a self-similar shape. Therefore, in creating a fractal-like object, the best that can practically be created is an object having multiple fractal type iterations or, in other words, an object with multiple but a finite number of fractal iterations at multiple scaling levels.

The Plaintiff’s, Defendants’, and Judge Gilstrap’s constructions of “fractal type antenna” all attempt to address the issue of defining a fractal in the context of the practical limitations on creating a fractal-like object. The Plaintiff’s proposed construction, which is “an antenna with a self-similar shape generated in an iterative manner,” captures the self-similar shape requirement of a fractal, but leaves out the requirement for this to occur on multiple scaling levels and fails to address the practical limitation of not being able to create a real object that is a fractal. The Defendants’ proposed construction, which is “an antenna possessing ideal fractal geometry,” fails to address the practical limitations of creating a fractal object. Because it is impossible to create an antenna possessing ideal fractal geometry, the Defendants’ proposed construction does little to define anything. Judge Gilstrap’s construction, which is “an antenna with a self-copying shape generated in an iterative manner on different scaling levels,” is better than the Plaintiff’s and Defendants’ proposed constructions, because it addresses the fractal property of having self-similar shapes at different scaling levels.

The Court believes that it is not necessary to attempt to define the word “fractal” in the construction of this phrase. The unclarity of the phrase does not stem from the definition of “fractal.” Instead the unclarity of the phrase comes from the application of that mathematical concept to the actual object that is claimed. A person of ordinary skill in the art would understand these issues in the context of the patents in suit. A person of ordinary skill in the art would also understand that the claim’s reference to a fractal type antenna cannot be to a true fractal. Instead, the reference to a fractal type antenna is to an antenna having multiple fractal iterations, but it is not to a true fractal because there are only a finite number of fractal iterations on the antenna, as opposed to a true fractal which has an infinite number of fractal iterations. For these reasons, the Court construes “fractal type antenna” to mean “an antenna having a shape with multiple but a finite number of fractal iterations at different scaling levels.”

Fractus, S.A. v. ZTE Corp., et al., No. 3:18-CV-2838-K, Amended *Markman* Order at 5–7 (N.D. Tex. Mar. 15, 2019) (Kinkeade, J.) (attached to Defendants’ response brief (Dkt. No. 65) as Exhibit I).

Defendants argue that “‘fractal’ was not commonly understood even among the mathematical elites, much less an antenna designer.” (Dkt. No. 65, at 16). But in *ZTE*, this Court as well as the Northern District of Texas (cited and reproduced above) found reasonable clarity as to how to apply the term “fractal” in the context of antennas, taking into account the inherent limitations of applying a mathematical concept to the manufacturing of a real-world physical structure. The *Walter* case cited by Defendants is therefore unpersuasive. *See In re Walter*, 698 F. App’x 1022, 1026 (Fed. Cir. Aug. 21, 2017) (finding “block-like” indefinite).

The Court therefore rejects Defendants’ indefiniteness arguments. As to the proper construction, the Court adopts the notion of “finite” iterations as set forth in the above-reproduced analysis of the Northern District of Texas. Nonetheless, construing the disputed term so as to provide guidance regarding the meaning of the word “fractal” (rather than simply using the word “fractal” in the construction) will assist the finder of fact.

The Court accordingly hereby construes **“fractal type antenna”** to mean **“an antenna having a finite number of self-copying shape iterations at different scaling levels.”**

I. “substantially similar impedance level and radiation pattern,” “radio electric behavior substantially similar,” and “substantially similar combined amount of resistance and reactance . . . and radiation pattern”

“substantially similar impedance level and radiation pattern”

(’421 Patent, Claim 1;
’069 Patent, Claim 33)

“radio electric behavior substantially similar”

(’432 Patent, Claim 1;
’431 Patent, Claim 1;
’541 Patent, Claim 17)

“substantially similar combined amount of resistance and reactance . . . and radiation pattern”

(’617 Patent, Claim 17)

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary	Indefinite Alternatively: “substantially similar impedance level as characterized by the return loss (L_R) which must be less than -14 dB or equivalent SWR (<1.5), and substantially similar radiation pattern”

(Dkt. No. 56, Ex. B, at 18–19; Dkt. No. 61, at 16; Dkt. No. 71, Ex. A, at 3, 8, 12, 15–16, 18–19 & 27).

(1) The Parties’ Positions

Plaintiff submits that *Samsung* found as to the ’431 Patent and the ’432 Patent that “a person of ordinary skill in the art ‘would understand what it means for radiation patterns to be similar.’” (Dkt. No. 61, at 17 (quoting *Samsung* at 27)). Plaintiff also submits that the Court rejected a similar indefiniteness argument in *Fractus, S.A. v. AT&T Mobility LLC*, 2:18-CV-00135-JRG, 2019 WL 1641357, at *28 (E.D. Tex. Apr. 16, 2019) (regarding United States Patent No.

7,932,870). (Dkt. No. 61, at 17). Plaintiff urges that “[t]he term ‘substantially similar’ remains reasonably clear in the context of these patents.” (*Id.*). Plaintiff also argues, based on the specification, that “‘substantially similar’ is reasonably clear in the context of impedance levels,” and “[t]here does not need to be a specific degree of similarity for these terms to provide clarity.” (*Id.*, at 18–19). As to Defendants’ alternative proposed construction, Plaintiff argues that “TCL’s proposed limitation would artificially and unnecessarily limit the potential range of applications of the multilevel antenna.” (*Id.*, at 19; *see id.*, at 19–20).

Defendants respond that “[t]he disputed terms are indefinite because they include a term of degree—‘substantially similar’—but neither the Patents-in-Suit nor their respective prosecution histories provide objective boundaries on the term.” (Dkt. No. 65, at 17–18). Defendants also argue that the examples disclosed in the specification do not provide sufficient guidance. (*Id.*, at 18). Regarding impedance levels, Defendants argue that “the bulk of Fractus’ argument relates to how impedance may be measured, which is irrelevant and undisputed.” (*Id.*, at 19). “By analogy,” Defendants argue, “one may understand that temperature may be measured in degrees Centigrade, but that does not tell one how to determine if two temperatures are ‘substantially similar.’” (*Id.*).

Plaintiff replies that Defendants have mischaracterized the testimony of Plaintiff’s expert, Dr. Stuart Long, and Plaintiff submits that “Dr. Long unequivocally stated that a person of ordinary skill in the art would know what it meant for two impedance levels to be substantially similar.” (Dkt. No. 67, at 7). Plaintiff also argues that Defendants’ alternative proposed construction “imports a return loss metric from certain example embodiments.” (*Id.*).

At the July 6, 2021 hearing, Plaintiff argued that Defendants’ alternative proposed construction improperly imports a limitation from a preferred embodiment. Defendants argued

that at least one objective criterion is needed to determine if the similarity is “substantial,” and the specification discloses no such criterion. Defendants also argued that their alternative proposed construction uses the only conceivable objective guidance in the specification.

(2) Analysis

“The parties agree that these three terms should be construed similarly.” (Dkt. No. 65, at 17).

In *Samsung*, the Court found:

A person of ordinary skill in the art, reading the MLV specifications, would understand what it means for radiation patterns to be similar. *See Seattle Box Co., Inc. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984) (district court must determine whether terms of degree would be understood by a person of ordinary skill in the art in light of the specification). Plaintiff is correct that the MLV specifications describe that characteristics such as “omnidirectionality or directivity” make two radiation patterns similar. *See '868 [Patent]*⁷ at 8:37–42; *id.* at 9:30–36. Moreover, Defendants own exhibits and patents demonstrate that the term “similar radiation patterns” is a phrase used in the field of antenna design. *See* DEF. REPLY MSJ at Ex. YY (“Similar radiation pattern has been obtained throughout the operating frequency band”); (Doc. No. 459, Ex. AH at 4:14–15 “PL.’S SURREPLY MSJ”) (“[t]he graphs of FIGS. 3B and 3C, when compared with each other, demonstrate substantially similar radiation patterns”). As such, the Court construes “substantially similar” and “basically the same” according to their plain and ordinary meaning.

Samsung at 27.

In *AT&T*, as to others patents held by Plaintiff, the Court rejected an indefiniteness argument as to “radiation and impedance patterns that are substantially similar . . . ,” finding that “substantially” was “readily understandable” in this context. *Fractus, S.A. v. AT&T Mobility LLC*, No. 2:18-CV-00135-JRG, 2019 WL 1641357, at *28 (E.D. Tex. Apr. 16, 2019) (construing terms in United States Patent No. 7,932,870).

⁷ United States Patent No. 7,015,868, one of the patents at issue in *Samsung*, is an ancestor of the present patents-in-suit.

The specification discloses, for example:

A particular property of multilevel antennae is that their radioelectric behavior can be similar in several frequency bands. Antenna input parameters (impedance and radiation diagram) remain similar for several frequency bands (that is, the antenna has the same level of adaptation or standing wave relationship in each different band), and often the antenna presents almost identical radiation diagrams at different frequencies.

'432 Patent at 3:1–8; *see* '432 Patent at Figs. 9 & 10.1–10.4; *see also id.* at 4:33–34 (“FIG. 10 shows radiation diagrams for the multilevel antenna of FIG. 8: horizontal and vertical planes.”) & 8:40–46.

Based on the Court’s prior analysis cited above, as well as based on review of the arguments, evidence, and authorities cited in the present case, the Court rejects Defendants’ indefiniteness argument. *See, e.g., Exmark*, 879 F.3d at 1345; *Tinnus*, 846 F.3d at 1206; *Deere*, 703 F.3d at 1359; *Verve*, 311 F.3d at 1120; *Ecolab*, 264 F.3d at 1367. The opinion of Plaintiff’s expert is further persuasive. (*See* Dkt. No. 61, Ex. 13, Mar. 18, 2021 Long Decl., at ¶ 32 (“Similar values of the SWR or the return loss (RL) over the desired frequency bands are the best measures of the ‘substantially similar impedance level.’”); *see also id.*, at ¶ 38). The authorities cited by Defendants, such as *Datamize* (which involved an “aesthetically pleasing” term), are also unpersuasive. *See, e.g., Datamize*, 417 F.3d at 1354 (“[T]he identification of parameters one might consider fails to explain how the parameters should be evaluated or weighed to reach the conclusion that an interface screen is ‘aesthetically pleasing.’”); *Interval Licensing*, 766 F.3d at 1371 (affirming district court’s finding of indefiniteness as to the term “unobtrusive manner” because “whether something distracts a user from his primary interaction depends on . . . the circumstances under which any single user interacts with the display”); *Geneva Pharms. Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003) (rejecting as “the epitome of indefiniteness” a construction under which “a formulation . . . might infringe or not depending on

its usage in changing circumstances”); *Berkheimer*, 881 F.3d at 1363. The opinions of Defendants’ expert in this regard are likewise unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 85–87).⁸

Defendants cite Figure 9, Figure 12, the written description, and the opinions of Defendants’ expert as support for Defendants’ alternative proposal of “return loss (LR) which must be less than -14 dB or equivalent SWR (<1.5).” See ’432 Patent at 8:36–39 & 9:25–27. On balance, this is a specific feature of particular disclosed embodiments that should not be imported into the claim construction. See *Phillips*, 415 F.3d at 1323; see also ’432 Patent at 7:34–46 (“Below are described, for purposes of illustration only, two non-limiting examples of operational modes for Multilevel Antennae (AM1 and AM2) for specific environments and applications.”).⁹

The Court therefore expressly rejects Defendants’ proposed construction, and no further construction is necessary. See *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) (“Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the

⁸ The parties’ competing citations of, and arguments regarding, the deposition of Plaintiff’s expert, Dr. Stuart Long, do not significantly affect the Court’s analysis. (See Dkt. No. 61, Ex. 12, Mar. 30, 2021 Long dep. at 271:9–12; see also Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 237:18–238:6, 238:17–24, 243:4–244:24, 264:5–25, 263:2–21 & 278:5–17). To whatever extent Defendants have called these opinions of Plaintiff’s expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence. See *Sonix*, 844 F.3d at 1377.

⁹ See also ’432 Patent, Cl. 6 (“wherein said antenna is included in a portable communications device”); Dkt. No. 61, Ex. 13, Mar. 18, 2021 Long Decl., at ¶ 46:

I disagree with th[e] opinion [of Defendants’ expert] because an SWR < 1.5 is not representative for mobile phones. A person of ordinary skill in the art would understand that for internal antennas for mobile phones, inherent restrictions on their design make such a level of SWR unreasonable. As these antennas must be compact enough to fit inside the handset in a very tight environment, and must operate effectively at a number of widely separated frequency bands, a much larger value of SWR is acceptable and common.

determination of infringement. It is not an obligatory exercise in redundancy.”); *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (“[D]istrict courts are not (and should not be) required to construe every limitation present in a patent’s asserted claims.”); *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1207 (Fed. Cir. 2010) (“Unlike *O2 Micro*, where the court failed to resolve the parties’ quarrel, the district court rejected Defendants’ construction.”); *ActiveVideo Networks, Inc. v. Verizon Commcn’s, Inc.*, 694 F.3d 1312, 1326 (Fed. Cir. 2012); *Summit 6, LLC v. Samsung Elecs. Co., Ltd.*, 802 F.3d 1283, 1291 (Fed. Cir. 2015); *Bayer Healthcare LLC v. Baxalta Inc.*, 989 F.3d 964, 977–79 (Fed. Cir. 2021). Moreover, assessing “substantial similarity” is a task not atypical for resolution by a jury, especially with the aid of competing expert testimony. Defendants have not persuaded the Court to depart from the plain and ordinary meaning. *See Phillips*, 415 F.3d at 1312.

The Court accordingly hereby construes **“substantially similar impedance level and radiation pattern,” “radio electric behavior substantially similar,” and “substantially similar combined amount of resistance and reactance . . . and radiation pattern”** to have their **plain meaning**.

J. “current” terms

<p>“circuitous current” (’432 Patent, Claim 1; ’431 Patent, Claim 1; ’541 Patent, Claim 17)</p> <p>“current within [the/said] [first/second/third] portion” (’541 Patent, Claim 17)</p> <p>“winding current” (’069 Patent, Claim 32; ’421 Patent, Claim 1)</p> <p>“electric currents on the [first/second] portion” (’617 Patent, Claim 17)</p>	<p>Plaintiff’s Proposed Construction</p> <p>No construction necessary; plain and ordinary meaning applies</p> <p>Defendants’ Proposed Construction</p> <p>Indefinite</p>
---	--

(Dkt. No. 56, Ex. B, at 21; Dkt. No. 61, at 20; Dkt. No. 71, Ex. A, at 3, 8, 12–13, 15, 19 & 27).

(1) The Parties’ Positions

Plaintiff argues, for example, “a person skilled in the art could look at current density diagrams and, relying on the principle that radiated power is proportional to the current density squared, would be able to determine which arrangement of geometric elements or portions were contributing to that radiated power.” (Dkt. No. 61, at 21 (citation omitted)). As to “circuitous” and “winding,” Plaintiff argues that “[s]imilarly to the ‘substantial’ terms, it is not a specific degree or amount of bending or winding, but rather the nature of the current path that is important and that a person skilled in the art would be able to determine.” (*Id.* (citation omitted)).

Defendants respond that “the claims use ‘current’ in a specialized way, but do not reasonably describe the unique meaning,” and “the claim terms that require ‘circuitous’ or

‘winding’ current paths do not reasonably apprise a person of ordinary skill in the art as to their scope.” (Dkt. No. 65, at 21–22).

Plaintiff replies that “[a] person of ordinary skill in the art would know that the relevant current can be determined from which sections of the antenna contribute to the radiation.” (Dkt. No. 67, at 7–8 (citation omitted)). Plaintiff also argues that “circuitous” and “winding” are reasonably clear, especially in light of the specification and the prosecution history. (*Id.*, at 8).

At the July 6, 2021 hearing, Plaintiff argued that the claims and the specification refer to the portions of the antenna that are radiating. Defendants argued that although the parties agree there will be some amount of current *throughout* the entire antenna, there are no objective criteria in the intrinsic evidence regarding what is *relevant* current for these limitations, and the result is an impermissible “zone of uncertainty” as discussed in *Nautilus*, 572 U.S. 909–10.

(2) Analysis

These terms were not presented as disputed terms in *Samsung* or *ZTE*.

As to “winding current,” the meaning of this term is reasonably clear in light of disclosure in the specification:

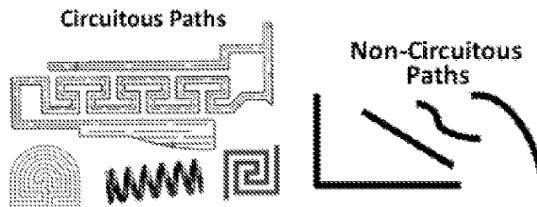
In addition to their multiband behavior, multilevel structure antennae usually have a smaller than usual size as compared to other antennae of a simpler structure. (Such as those consisting of a single polygon or polyhedron). This is because the path followed by the electric current on the multilevel structure is longer and more *winding* than in a simple geometry, due to the empty spaces between the various polygon or polyhedron elements. Said empty spaces force a given path for *the current (which must circumvent said spaces) which travels a greater distance* and therefore resonates at a lower frequency.

’432 Patent at 3:16–26 (emphasis added).

As to “circuitous,” the language of Claim 1 of the ’432 Patent, for example, provides context by reciting (emphasis added): “empty spaces in an overall structure of the conductive radiating element to provide a *circuitous* current path.”

The patent office proceedings cited by the parties are consistent with “winding” and “circuitous” being understandable. (See Dkt. No. 65, Ex. B, Oct. 2, 2012 Patent Owner’s Reply to Action Closing Prosecution, at 25 (TCL-FRAC00033644) (“The term ‘circuitous’ has a well-accepted ordinary meaning as ‘long and winding.’”); *see id.*, at 25–32 (TCL-FRAC00033644–51); *id.*, Ex. N, Aug. 2, 2012 Action Closing Prosecution, at 27 (“a circuitous path may be formed by successive straight lines”)).

The demonstrative illustrations in prosecution history cited by Defendants do not give rise to any lack of reasonable clarity as to the meaning of “circuitous” but rather provide further context. (See Dkt. No. 65, at 22–23 (citing Ex. B, Oct. 2, 2012 Patent Owner’s Reply to Action Closing Prosecution)). These illustrations are reproduced here:



Although these demonstratives were created in the course of an *inter partes* reexamination and therefore may be of lesser weight than if they had been created in a pre-litigation, non-adversarial context, these demonstratives are still useful and may be given some amount of weight in considering how the patentee has used the terms here at issue.

As to the “portion” terms, the specification discloses:

The present invention consists of an antenna whose radiating element is characterised by its geometrical shape, which basically comprises several polygons or polyhedrons of the same type.

* * *

The number of frequency bands is proportional to the number of scales or sizes of the polygonal elements or similar sets in which they are grouped contained in the geometry of the main radiating element.

'432 Patent at 2:43–47 & 3:11–15.

The claims provide context for understanding “portions,” such as with reference to “a plurality of geometric elements” that is “associated with [first/second/third] frequency band” in Claim 17 of the '541 Patent, which recites (emphasis added):

17. A multi-band antenna comprising:

a ground plane; and

a conductive radiating element electrically coupled to the ground plane and including at least one multilevel structure,

 said at least one multilevel structure comprising a plurality of electromagnetically coupled geometric elements, wherein a perimeter of the multilevel structure has more than five sides,

 said plurality of geometric elements including at least three portions, a *first portion* being associated with a first selected frequency band, a *second portion* being associated with a second selected frequency band and a *third portion* being associated with a third selected frequency band, at least substantial parts of said second and third portions being part of the first portion, said first, second and third portions defining empty spaces in an overall structure of the conductive radiating element to provide respective circuitous current paths within the first portion, within the second portion and within the third portion, a plurality of the circuitous current paths overlapping within a plurality of the geometric elements, and

 the *current within said first portion* providing said first selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said second and third selected frequency bands, the *current within the second portion* providing said second selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said first and third selected frequency bands, and the *current within the third portion* providing said third selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said first and second selected frequency bands,

 wherein the multi-band antenna is an internal antenna concealed within a portable communications device.

Claim 17 of the '617 Patent is similar in this regard. *See* '617 Patent, Cl. 17 (reciting, for example, “a first portion having a first geometry configured to operate at a range of frequencies of the three ranges of frequencies” and “at least one structure including a generally identifiable non-convex geometric element, wherein said non-convex geometric element comprises a plurality of convex geometric elements defining the first portion”).

Defendants submit that “current will travel through all of the radiating part of an antenna when that antenna is sending or receiving a signal” (Dkt. No. 65, at 21), as Plaintiff’s expert has evidently acknowledged,¹⁰ and Defendants’ expert acknowledges that a person of ordinary skill in the art “could run computer simulations using computational electromagnetic modeling to show the levels of current at locations within the antenna for different frequencies.” (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 91). Defendants do not demonstrate that the “portions” terms require current to be present only within certain portions at particular times. *See, e.g.*, ’541 Patent, Cl. 17 (reproduced above). The opinions of Plaintiff’s expert are persuasive in this regard. (See Dkt. No. 61, Ex. 13, Mar. 18, 2021 Long Decl., at ¶¶ 49–50). Defendants’ argument that the patents-in-suit fail to disclose a “threshold” current (*see* Dkt. No. 65, at 21) is unavailing.

Finally, the indefiniteness opinions of Defendants’ expert are unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 92–94 & 99). The *Halliburton* case cited by Defendants is likewise unpersuasive. *See Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1256 (Fed. Cir. 2008) (finding “fragile gel” term indefinite). Indeed, Plaintiff points out that Defendants’ expert demonstrated an understanding of different “portions” of a multilevel antenna in a declaration in support of a petition for *inter partes* review of the ’431 Patent. (Dkt. No. 61, Ex. 14, IPR2018-01451, Aug. 3, 2018 Bartone Decl., at ¶¶ 257–58).¹¹

¹⁰ (See Dkt. No. 61, Ex. 13, Mar. 18, 2021 Long Decl., at ¶ 49).

¹¹ The parties’ competing citations of, and arguments regarding, the deposition of Plaintiff’s expert, Dr. Stuart Long, do not significantly affect the Court’s analysis. (See Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 53:17–54:6 (current travels through all portions of antenna), 56:2–7 (similar), 58:24–59:13 (referring to “significant” current), 59:14–19 (“I don’t think it’s something that you can put a specific level on.”), 60:17–20, 62:7–10 (“significant” currents are “the ones that I would say are primarily responsible for the radiating fields from the antenna”), 62:11–18, 68:2–69:10, 72:22–74:5, 81:3–83:25 (regarding demonstrative illustrations in prosecution history) & 84:10–13). To whatever extent Defendants have called these opinions of

The Court therefore expressly rejects Defendants' indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes “**circuitous current**,” “**winding current**,” “**current within [the/said] [first/second/third] portion**,” and “**electric currents on the [first/second] portion**” each to have their **plain meaning**.

K. “wherein the geometric elements are arranged such that the antenna element does not comprise a group of single band antennas that respectively operate in the at least first and second non-overlapping frequency bands”

“**wherein the geometric elements are arranged such that that the antenna element does not comprise a group of single band antennas that respectively operate in the at least first and second non-overlapping frequency bands”**

(’421 Patent, Claim 1;
’069 Patent, Claim 32)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
No construction necessary	Indefinite

(Dkt. No. 56, Ex. B, at 21–22; Dkt. No. 61, at 22; Dkt. No. 71, Ex. A, at 15 & 19).

(1) The Parties' Positions

Plaintiff argues that “TCL’s entire indefiniteness argument rests on the curious notion that something other than the frequency bands themselves should be used to determine whether the frequency bands overlap or not. But the claim itself provides the property, characteristic, or metric

Plaintiff's expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence. *See Sonix*, 844 F.3d at 1377.

that determines overlap: the frequency band itself,” and “the specifications supply several examples of frequency bands.” (Dkt. No. 61, at 22 (citations omitted)).

Defendants respond that whereas presumably something distinguishes a single multiband antenna from multiple single-band antennas, “[n]either the claims, the Written Description, nor the prosecution history of the ’421 patent (the only patent that recites this term) provides objective guidance on this point.” (Dkt. No. 65, at 23). Defendants also argue that, as to the “peripheral dispute” regarding “how to determine non-overlapping frequency bands,” “Fractus fails to offer any objective guidance on this point.” (*Id.*, at 24).

Plaintiff replies that the claim language and the specification are sufficiently clear regarding distinguishing a group of single-band antennas. (*See* Dkt. No. 67, at 8).

At the July 6, 2021 hearing, Plaintiff reiterated the arguments set forth in its briefing. Defendants argued that the specification contains no objective guidance and that confusion arises when antenna structures physically overlap one another.

(2) Analysis

Claim 32 of the ’069 Patent, for example, recites (emphasis added):

32. An apparatus comprising:

an internal antenna element having a multi-band behavior, the antenna element being concealed within a portable communication device and configured to operate in at least three frequency bands, the antenna element comprising a plurality of geometric elements arranged to provide at least three winding current paths that circumvent empty spaces in the antenna element, the at least three winding current paths respectively corresponding to the at least three frequency bands to provide the antenna element with the multi-band behavior, wherein portions of the at least three winding current paths extend along a plurality of common geometric elements; and

a ground plane, the antenna element being electrically coupled to the ground plane;

wherein the geometric elements are arranged such that the antenna element does not comprise substantially non-overlapping portions that serve as respective single band antennas.

The specification discloses:

In specialized literature it is already possible to find descriptions of certain antennae designs which allow to cover a few bands. However, in these designs the multiband behavior is achieved by *grouping several single band antennae* or by incorporating reactive elements in the antennae (concentrated elements as inductors or capacitors or their integrated versions such as posts or notches) which force the apparition of new resonance frequencies. *Multilevel antennae on the contrary base their behavior on their particular geometry*, offering a greater flexibility to the antenna designer as to the number of bands (proportional to the number of levels of detail), position, relative spacing and width, and thereby offer better and more varied characteristics for the final product.

'432 Patent at 3:45–57 (emphasis added).

Plaintiff's expert has opined regarding how to determine whether geometric elements are arranged such that the antenna element does not comprise a group of single band antennas. (*See* Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 226:25–227:13). Also, Defendants' expert acknowledges that defined frequency bands can be compared to determine whether they are overlapping. (Dkt. No. 61, Ex. 11, Mar. 29, 2021 Bartone dep. at 95:15–22).

On balance, the claim language here at issue “inform[s] those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus*, 572 U.S. at 910. The contrary opinions of Defendants' expert are unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 98–102).¹²

The Court therefore expressly rejects Defendants' indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at

¹² The parties' competing citations of, and arguments regarding, the deposition of Plaintiff's expert, Dr. Stuart Long, do not significantly affect the Court's analysis. (*See* Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 226:10–11, 226:25–227:13 & 227:25–228:14). To whatever extent Defendants have called these opinions of Plaintiff's expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence. *See Sonix*, 844 F.3d at 1377.

1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes “**wherein the geometric elements are arranged such that that the antenna element does not comprise a group of single band antennas that respectively operate in the at least first and second non-overlapping frequency bands**” to have its **plain meaning**.

L. “generally identifiable”

“generally identifiable” (’632 Patent, Claim 17; ’617 Patent, Claim 17)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary	Indefinite

(Dkt. No. 56, Ex. B, at 22; Dkt. No. 61, at 23; Dkt. No. 71, Ex. A, at 23 & 27).

(1) The Parties’ Positions

Plaintiff argues that “there can be little question that even a lay person understands the plain and ordinary meaning of ‘generally’ as referring to usually or most of the time.” (Dkt. No. 61, at 24 (citation omitted)).

Defendants respond that “[t]his element summons the vagaries of a person’s opinion,” as “what elements are ‘generally identifiable’ varies from observer to observer.” (Dkt. No. 65, at 24 (citation omitted)). Defendants also argue: “That Dr. Bartone [(Defendants’ expert)] was able to find elements in prior art antennas that satisfy this claim term does not create an objective standard for when elements are ‘generally identifiable’ or not.” (*Id.*, at 25 (citation omitted)).

Plaintiff replies that Defendants' reliance on case law regarding the subjectivity of a term such as "aesthetically pleasing" is inapplicable and unpersuasive as to the use of "generally identifiable" in the patents-in-suit. (Dkt. No. 67, at 9).

At the July 6, 2021 hearing, Defendants argued that Plaintiff's own expert, in his deposition, was unable to point to any generally identifiable geometric elements, which Defendants argued demonstrates that the opinions of Plaintiff's expert are unreliable and do not support Plaintiff's arguments against indefiniteness. Plaintiff argued that Defendants' arguments pertain to infringement, not indefiniteness.

(2) Analysis

The word "generally" is a word used in common parlance and has not been shown to have any special technical meaning in the present case. Defendants' indefiniteness argument is undermined by constructions of terms including the word "generally" in other cases. *See, e.g., Sparton Corp. v. United States*, 68 Fed. Cl. 34, 46 (2005) (finding that "the generally understood meaning of the term 'generally'" is "for the most part"); *Neodron, Ltd. v. Lenovo Grp., Ltd.*, No. 19-CV-05644-SI, 2020 WL 3962002, at *6 (N.D. Cal. July 13, 2020) (Illston, J.) (rejecting indefiniteness argument as to the term "generally straight line," noting that the Federal Circuit has found "the word 'generally' acts as a descriptive term 'commonly used in patent claims to avoid a strict numerical boundary'"') (quoting *Anchor Wall Sys., Inc. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1310–11 (Fed. Cir. 2003)).

This is consistent with use of the word "identifiable" in the specification: "FIG. 4 describes multilevel structures (4.1–4.14) formed by parallelepipeds (squares, rectangles, rhombi . . .). Note that the component elements are always individually identifiable (at least most of them are)." '432 Patent at 5:35–38.

Indeed, Dr. Bartone was able to apply the word “generally” in a declaration in support of a petition for *inter partes* review of the ’632 Patent:

While the specification of the ’632 Patent does not specify how closed figures within an antenna structure is [sic, are] identified, I could visually follow the contour of the Grangeat antenna by moving from left to right and bottom to top of the antenna structure shown below to identify longest perimeters for each rectangular polygon such that the least number of polygons necessary to form the *generally* distinguishable polygons are determined. The perimeters of these closed plane figures are also interconnected, as shown in the figure below.

(Dkt. No. 61, Ex. 15, IPR2018-01462, Aug. 3, 2018 Bartone Decl., at ¶ 289 (emphasis modified)).

Defendants cite authority that “indefiniteness of a claim does not always imply inability to conduct a prior-art analysis needed for an *inter partes* review,” *Cochlear Bone Anchored Sols. AB v. Oticon Med. AB*, 958 F.3d 1348, 1360 (Fed. Cir. 2020), but the statement by Defendants’ expert is nonetheless worthy of consideration in assessing whether the disputed term is indefinite.

Based on all of the foregoing, the contrary opinion of Defendants’ expert (that indefiniteness arises here because what elements are “generally identifiable” is subjective) is unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 103). The parties’ competing citations of the deposition of Plaintiff’s expert, Dr. Stuart Long, do not compel otherwise. (See Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 124:7–8, 124:17–125:17, 127:8–13 & 128:5–14). To whatever extent Defendants have called these opinions of Plaintiff’s expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence, *see Sonix*, 844 F.3d at 1377, and Defendants have not met this burden. The above-cited authorities are compelling in the circumstances of the present case. *See, e.g., Anchor Wall Sys.*, 340 F.3d at 1310–11.

The Court therefore rejects Defendants’ indefiniteness argument, and any remaining dispute presents factual issues regarding infringement rather than any legal question for claim

construction. *See Acumed*, 483 F.3d at 806 (“[A] sound claim construction need not always purge every shred of ambiguity. The resolution of some line-drawing problems . . . is properly left to the trier of fact.”) (citing *PPG*, 156 F.3d at 1355 (“after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact”)); *see also Eon*, 815 F.3d at 1318–19 (citing *Acumed* and *PPG*).

The Court therefore expressly rejects Defendants’ indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes “**generally identifiable**” to have its **plain meaning**.

M. “at least substantial parts of said second and third portions being part of the first portion”

“at least substantial parts of said second and third portions being part of the first portion” (’541 Patent, Claim 17)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“the second and third portions have areas that substantially overlap an area of the first portion, where the portions differ in size or configuration”	Indefinite

(Dkt. No. 56, Ex. B, at 22; Dkt. No. 61, at 24; Dkt. No. 71, Ex. A, at 13).

(1) The Parties' Positions

Plaintiff argues that “this Court has already construed this term and it had no issues before with the meaning of ‘substantial.’” (Dkt. No. 61, at 25). Also, Plaintiff argues: “As the claim language recites, the substantial parts are of the ‘second *and* third’ portions. There is no ambiguity – this phrasing requires parts of each of the second and third portions.” (*Id.*).

Defendants respond that “the term ‘substantial’ is not attended by any objective boundaries,” and “it is unclear what the relevant measure is.” (Dkt. No. 65, at 25). “For example,” Defendants submit, “does this term concern the *number* of the parts of the second and third portions, the *areas* of the parts of the second and third portions, or something different?” (*Id.*).

Plaintiff replies:

Neither of TCL’s arguments about indefiniteness for this term have merit. First, for the same reasons as discussed above [regarding “substantially within”], the use of “substantial” does not make the term indefinite. Second, TCL attempts to generate confusion by referring to its expert’s questions about “what the relevant measure is.” TCL Br. [(Dkt. No. 65) at] 25. The claim language provides the answer: substantial parts of the second and substantial parts of the third portion need to be a part of the first portion. Questioning whether the relevant units are geometric elements and then raising further questions about fractions of those units does nothing to show indefiniteness given the plain language of the claim itself establishes that it is the portions that are the relevant units.

(Dkt. No. 67, at 9).

At the July 6, 2021 hearing, Defendants argued that Plaintiff’s expert has been unable to identify any objective criteria. Plaintiff argued that a person of ordinary skill in the art, reading this disputed term in context, knows whether there is substantial overlap.

(2) Analysis

Claim 17 of the ’541 Patent recites (emphasis added):

17. A multi-band antenna comprising:
a ground plane; and

a conductive radiating element electrically coupled to the ground plane and including at least one multilevel structure,

said at least one multilevel structure comprising a plurality of electromagnetically coupled geometric elements, wherein a perimeter of the multilevel structure has more than five sides,

said plurality of geometric elements including at least three portions, a first portion being associated with a first selected frequency band, a second portion being associated with a second selected frequency band and a third portion being associated with a third selected frequency band, *at least substantial parts of said second and third portions being part of the first portion*, said first, second and third portions defining empty spaces in an overall structure of the conductive radiating element to provide respective circuitous current paths within the first portion, within the second portion and within the third portion, a plurality of the circuitous current paths overlapping within a plurality of the geometric elements, and

the current within said first portion providing said first selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said second and third selected frequency bands, the current within the second portion providing said second selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said first and third selected frequency bands, and the current within the third portion providing said third selected frequency band with radio electric behavior substantially similar to the radio electric behavior of said first and second selected frequency bands,

wherein the multi-band antenna is an internal antenna concealed within a portable communications device.

ZTE construed this disputed term to mean “the second and third portions have areas that substantially overlap an area of the first portion, where the portions differ in size or configuration.”

ZTE at 43 & 45. There was no indefiniteness challenge in *ZTE*. *See id.* at 40–46.

“The word ‘substantially,’ when used in a claim, can denote either language of approximation or language of magnitude.” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1333 (Fed. Cir. 2010); *see Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1031 (Fed. Cir. 2002) (“[T]he phrase ‘substantially below’ signifies language of magnitude, i.e., not insubstantial.”). As to the rhetorical question posed in Defendants’ response brief—“does this term concern the *number* of the parts of the second and third portions, the *areas* of the parts of the

second and third portions, or something different?”¹³—the Court in *ZTE* found that the disputed term refers to substantially overlapping areas. *See ZTE* at 43–44.

Defendants do not persuasively justify departing from the Court’s analysis and construction in *ZTE*. *See id.* On balance, Defendants fail to demonstrate any lack of reasonable clarity as to the present disputed term. For example, the opinions of Defendants’ expert are unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 68–71). The authorities cited by Defendants, such as regarding particular usage of the phrase “at least about,” are unpersuasive. *See Amgen, Inc. v. Chugai Pharms Co., Ltd.*, 927 F.2d 1200, 1218 (Fed. Cir. 1991) (affirming indefiniteness finding as to a claim directed to erythropoietin that recited “a specific activity of at least about 160,000 IU per absorbance unit at 280 nanometers”).

The Court therefore hereby construes “**at least substantial parts of said second and third portions being part of the first portion**” to mean “**the second and third portions have areas that substantially overlap an area of the first portion, where the portions differ in size or configuration.**”

N. “portions substantially overlap”

“portions substantially overlap” (’632 Patent, Claim 17; ’617 Patent, Claim 17)	
Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary; plain and ordinary meaning applies	Indefinite

(Dkt. No. 56, Ex. B, at 23; Dkt. No. 61, at 26; Dkt. No. 71, Ex. A, at 23 & 28).

¹³ (Dkt. No. 65, at 25).

(1) The Parties' Positions

Plaintiff reiterates that “substantial” is reasonably clear, and Plaintiff argues that “TCL cannot demonstrate – apart from conclusory assertions by its expert – that a person of skill in the art could not identify this ‘overlap.’” (Dkt. No. 61, at 26).

Defendants respond that “[t]he record does not provide objective guidance as to whether portions ‘substantially’ overlap.” (Dkt. No. 65, at 26). Moreover, Defendants argue, “it is unclear what is the appropriate metric—the area of the parts of the portions that overlap, their number, or something different.” (*Id.* (citation omitted)).

Plaintiff reiterates that “the use of substantially does not make the term indefinite.” (Dkt. No. 67, at 9). Plaintiff argues that “again TCL attempts to generate confusion where none exists regarding what should overlap – and the answer again is that portions must overlap.” (*Id.*).

(2) Analysis

For the same reasons discussed above as to the term “at least substantial parts of said second and third portions being part of the first portion” and as to the “substantially within” terms, the present disputed term is not indefinite. The parties’ competing citations of the deposition of Plaintiff’s expert, Dr. Stuart Long, do not compel otherwise. (*See* Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 171:16–21 (“It’s just using the English term in its ordinary meaning.”), 177:12–23 (“I don’t think there’s a need or there is a specific amount or level for -- that would be needed to be identified for a person of ordinary skill in the art to understand what this term means, to understand what substantial overlap means.”), 179:17–24, 180:17–181:6 & 182:23–183:16).

To whatever extent Defendants have called these opinions of Plaintiff’s expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence. *See Sonix*, 844 F.3d at 1377. Defendants have not met that burden, and the the opinion

of Defendants' expert does not persuade the Court otherwise. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶ 114).

The Court therefore expressly rejects Defendants' indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes "**portions substantially overlap**" to have its **plain meaning**.

O. "associated with"

"associated with" ('432 Patent, Claim 1; '431 Patent, Claim 1; '541 Patent, Claim 17)	
Plaintiff's Proposed Construction	Defendants' Proposed Construction
No construction necessary	Indefinite

(Dkt. No. 56, Ex. B, at 23–24; Dkt. No. 61, at 26; Dkt. No. 71, Ex. A, at 3 & 13).

(1) The Parties' Positions

Plaintiff argues: "TCL relies on expert testimony that refers back to the 'current' terms and makes the same argument: that a person of ordinary skill could not tell how to determine which portions have current and therefore are 'associated with' particular frequency bands. For the same reasons as for the 'current' terms, TCL is wrong. The specifications teach that it is the radiating element in the operational frequency that defines what is a portion." (Dkt. No. 61, at 26 (citations omitted)).

Defendants respond:

As TCL best understands Fractus' position, whether this element is satisfied depends on current density distributions. However, Fractus fails to articulate any objective methodology. Is a portion "associated with" a frequency if all the portion has a current density above a certain amount? Instead, can the element be satisfied if only a segment of a portion has a current density above that threshold? If so, does it matter how large the segment is, how much above the threshold the current density is, or some combination of the two? Fractus leaves these questions unanswered in its opening brief.

(Dkt. No. 65, at 27).

Plaintiff replies that "[f]or the same reasons that TCL's arguments about current and indefiniteness fail, its arguments about portions being associated with frequency bands fail." (Dkt. No. 67, at 10).

At the July 6, 2021 hearing, Plaintiff submitted that current density is measured in decibels, which uses a scale in which intensity increases exponentially, so Plaintiff argued that the association relationship would be obvious to a person of ordinary skill in the art. Defendants argued that Plaintiff's expert has been unable to determine whether particular elements are associated with particular frequencies.

(2) Analysis

Claim 17 of the '541 Patent, for example, recites in relevant part (emphasis added): "said plurality of geometric elements including at least three portions, a first portion being *associated with* a first selected frequency band, a second portion being *associated with* a second selected frequency band and a third portion being *associated with* a third selected frequency band."

The parties agree that "associated with" presents essentially the same dispute as the terms "current within [the/said] [first/second/third] portion," and "electric currents on the [first/second] portion," which are addressed above.

For the same reasons discussed above as to those "current" terms, the meaning of "associated with" is reasonably clear in the context of the claims in which the term is used. The

opinion of Plaintiff's expert is further persuasive, such as that a person of ordinary skill in the art would be able to determine which portions are associated with which frequency bands based on current density. (See Dkt. No. 61, Ex. 13, Mar. 18, 2021 Long Decl., at ¶ 72). The parties' competing citations of the deposition of Plaintiff's expert, Dr. Stuart Long, do not compel otherwise. (See Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 187:10–24, 198:11–199:2, 205:7–18, 207:10–18, 208:25–209:25 & 214:6–217:6.

Further, even to whatever extent Defendants have called these opinions of Plaintiff's expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence, *see Sonix*, 844 F.3d at 1377, and Defendants have not met this burden. The opinions of Defendants' expert in this regard are unpersuasive. (See Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 112–15).

The Court therefore expressly rejects Defendants' indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes “**associated with**” to have its **plain meaning**.

P. “a closed figure defined by a free perimeter thereof and a projection of ones of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures”

“a closed figure defined by a free perimeter thereof and a projection of ones of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures”

('632 Patent, Claim 17)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
No construction necessary	Indefinite

(Dkt. No. 56, Ex. B, at 24; Dkt. No. 61, at 27; Dkt. No. 71, Ex. A, at 23).

(1) The Parties' Positions

Plaintiff argues that the phrases “free perimeter” and “longest exposed perimeter,” which Defendants’ expert opines are unclear, are in fact reasonably clear based on disclosures in the specification. (*See* Dkt. No. 61, at 27–29).

Defendants respond:

This element is inherently circular and thus indefinite. It requires that a closed figure (i.e., polygon) be defined by a free perimeter of the figure and projections of the longest exposed perimeters of the figure (i.e., polygon). However, the longest exposed perimeters of a figure cannot be identified until the figure is identified. Thus, this element fails to provide [*sic*] a person of ordinary skill in the art as to its scope with reasonable certainty.

(Dkt. No. 65, at 28).

Plaintiff replies that “the patent provides clear instructions on how to identify the various constituent shapes,” and “the patent does provide means to determine the least number of closed figures: for example, that the individual polygons contain the same number of sides.” (Dkt. No. 67, at 10 (citations omitted)).

At the July 6, 2021 hearing, Plaintiff presented no oral argument and instead rested on its briefing. Defendants reiterated the arguments set forth in their briefing.

(2) Analysis

Claim 17 of the '632 Patent recites (emphasis added):

17. A multi-band antenna including:

at least one structure for the multi-band antenna useable at least three ranges of frequencies, each of the at least three ranges of frequencies extending between two limiting frequencies, the at least one structure being included in a portable communication device and including at least two levels of detail, wherein one level of detail makes up another level of detail, the at least one structure including at least one antenna region comprising a set of closed figures bounded by the same number

of sides, the sides comprising one or more of straight lines, portions of circles and portions of ellipses,

the at least one structure including at least three portions, a first portion having a first geometry configured to operate at a range of frequencies of the three ranges of frequencies, a second portion located substantially within the first portion and having a second geometry configured to operate at a range of frequencies of the three ranges of frequencies and a third portion located substantially within the first portion and having a third geometry configured to operate at a range of frequencies of the three ranges of frequencies, the second and third portions substantially overlap with the first portion,

wherein each of the closed figures in the antenna region is directly or proximately linked to at least one other of the closed figures such that electromagnetic power is exchanged between the closed figures in the antenna region either directly through at least one point of contact or through a small separation providing coupling,

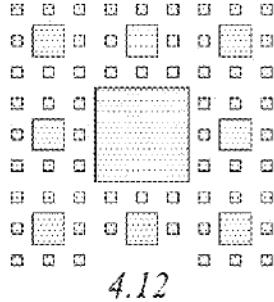
wherein for at least 75% of the closed figures, the region or area of contact between the closed figures is less than 50% of their perimeter or area,

wherein not all of the closed figures have the same size and the perimeter of the at least one structure has a different number of sides than the closed figures that compose the antenna region,

wherein each of a plurality of the closed figures of the antenna region is generally identifiable as *a closed figure defined by a free perimeter thereof and a projection of ones of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures* where the closed figures perimeters are interconnected, and

wherein the multi-band antenna is configured to operate at the at least three ranges of frequencies and wherein at least one of the at least three ranges of frequencies is within the 800 MHz–3600 MHz frequency range.

The specification informs the meaning of “free perimeter,” disclosing for example: “In case (4.12), specifically, said elements have 100% of their perimeter free, without there being any physical connection between them . . .” ’632 Patent at 5:57–59. The specification discloses that “FIG. 4 shows examples of multilevel structures based on parallelepipeds” (*id.* at 4:21–22), and Figure 4.12 is reproduced here:



Further, despite Defendants' arguments (*see* Dkt. No. 65, at 28), this disputed term is not circular. Instead, a person of ordinary skill in the art would understand how to identify free perimeters and how to project perimeters so as to form closed figures of the antenna region. The opinions of Defendants' expert to the contrary are unpersuasive. (*See* Dkt. No. 61, Ex. 4, Mar. 5, 2021 Bartone Decl., at ¶¶ 105–09). The demonstrative illustrations set forth by the patentee during reexamination, cited here by Defendants, do not compel otherwise. (*See* Dkt. No. 65, Ex. B, Oct. 2, 2012 Patent Owner's Reply to Action Closing Prosecution, at 10 (TCL-FRAC00033629)). Even if one assumes for the sake of argument that these demonstratives are inconsistent with the disputed term or are otherwise flawed, these demonstratives do not give rise to indefiniteness.

Finally, the parties' competing citations of the deposition of Plaintiff's expert, Dr. Stuart Long, do not demonstrate any indefiniteness. (*See* Dkt. No. 65, Ex. L, Mar. 30, 2021 Long dep. at 141:13–22, 149:12–13, 151:1–2, 164:8–9, 164:18–19 & 166:14–24; *see also* Dkt. No. 67, Ex. 1, Mar. 30, 2021 Long dep. at 137:3–10). To whatever extent Defendants have called these opinions of Plaintiff's expert into question, the burden remains on Defendants to prove indefiniteness by clear and convincing evidence. *See Sonix*, 844 F.3d at 1377.

The Court therefore expressly rejects Defendants' indefiniteness argument, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at

1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes “**a closed figure defined by a free perimeter thereof and a projection of ones of the longest exposed perimeters thereof to define the least number of closed figures within the region necessary to form the generally distinguishable closed figures**” to have its **plain meaning**.

V. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are **ORDERED** that they may not refer, directly or indirectly, to each other’s claim construction positions in the presence of the jury. Likewise, the parties are **ORDERED** to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

So ORDERED and SIGNED this 14th day of July, 2021.



RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE